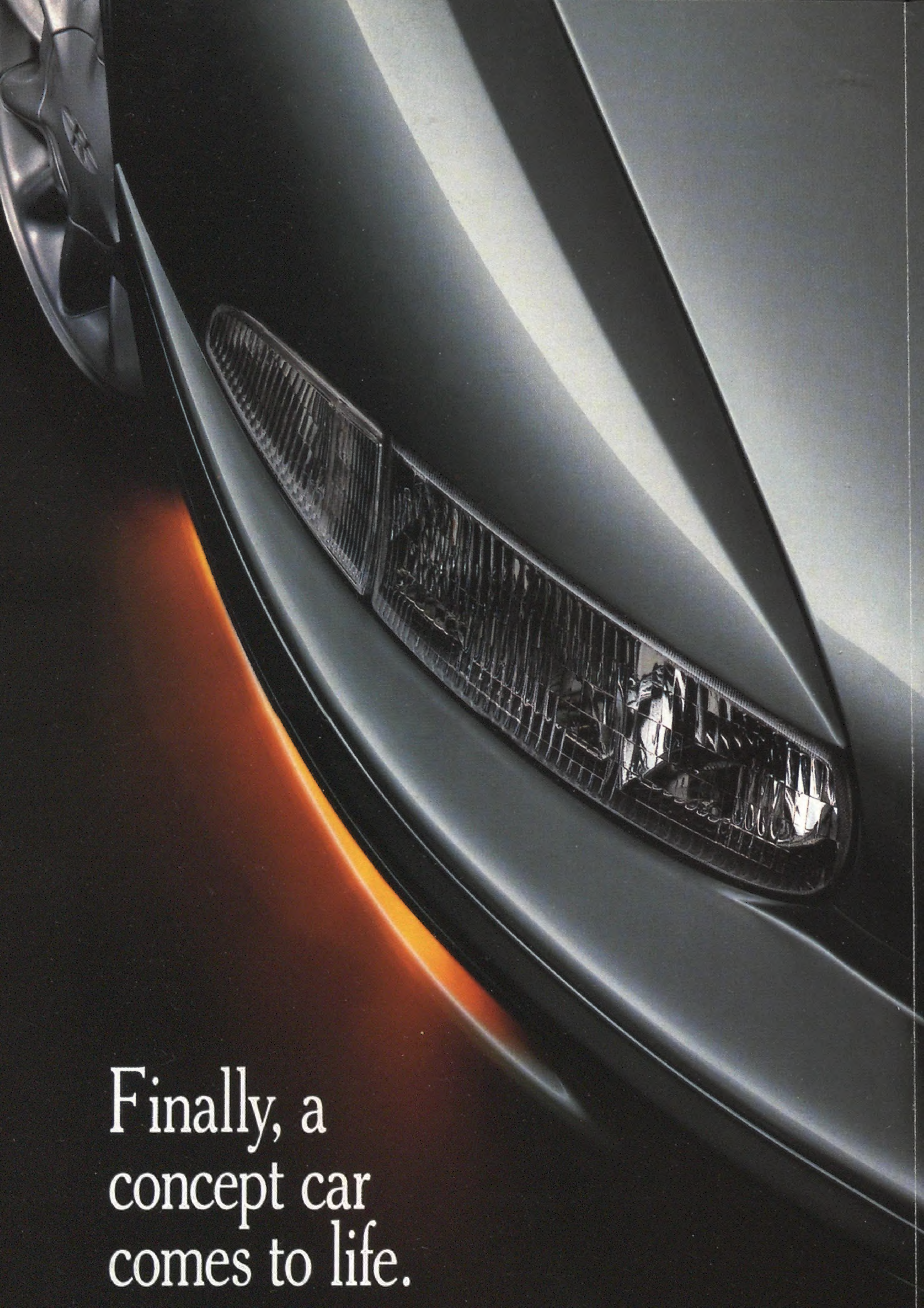
Smithsonian

September 1994

Rare domestic breeds stare extinction in the face (p. 60)



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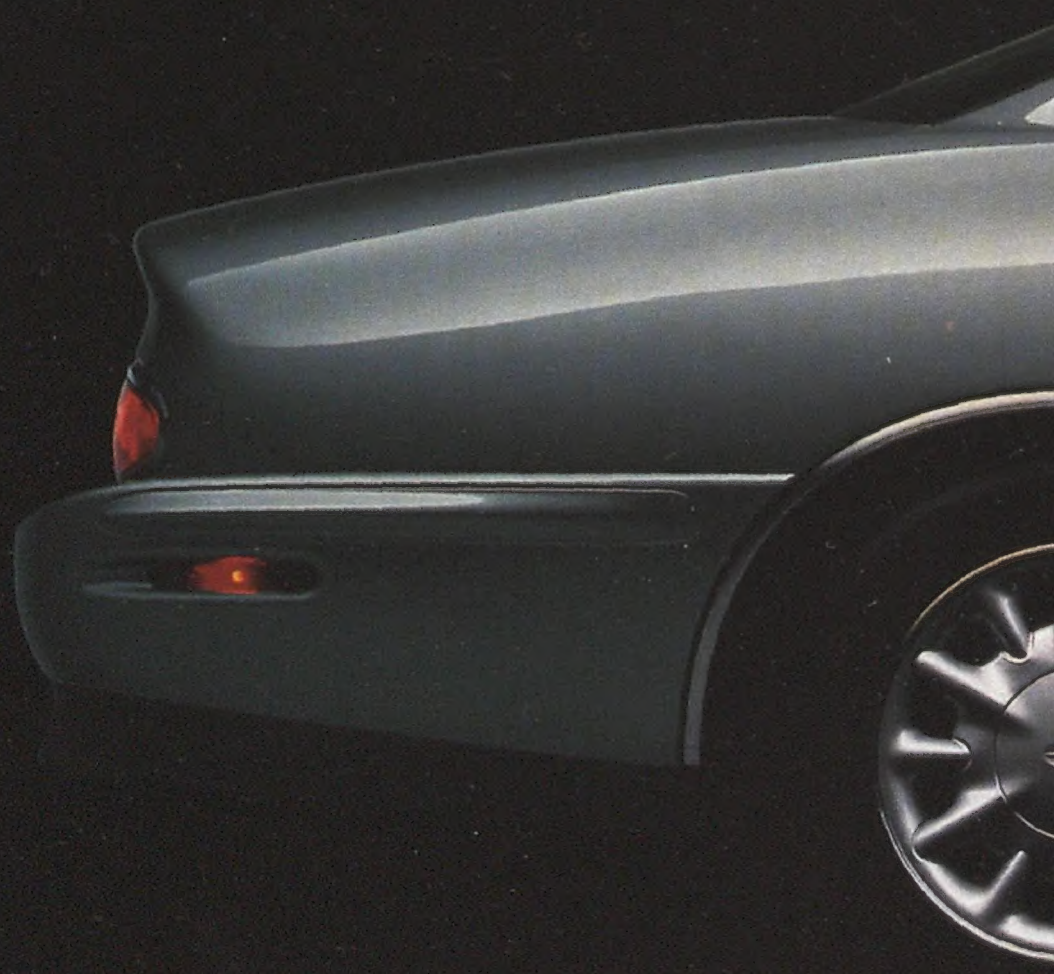

Riviera

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Buckle up, America!

September 1994

Smithsonian

Volume 25, Number 6

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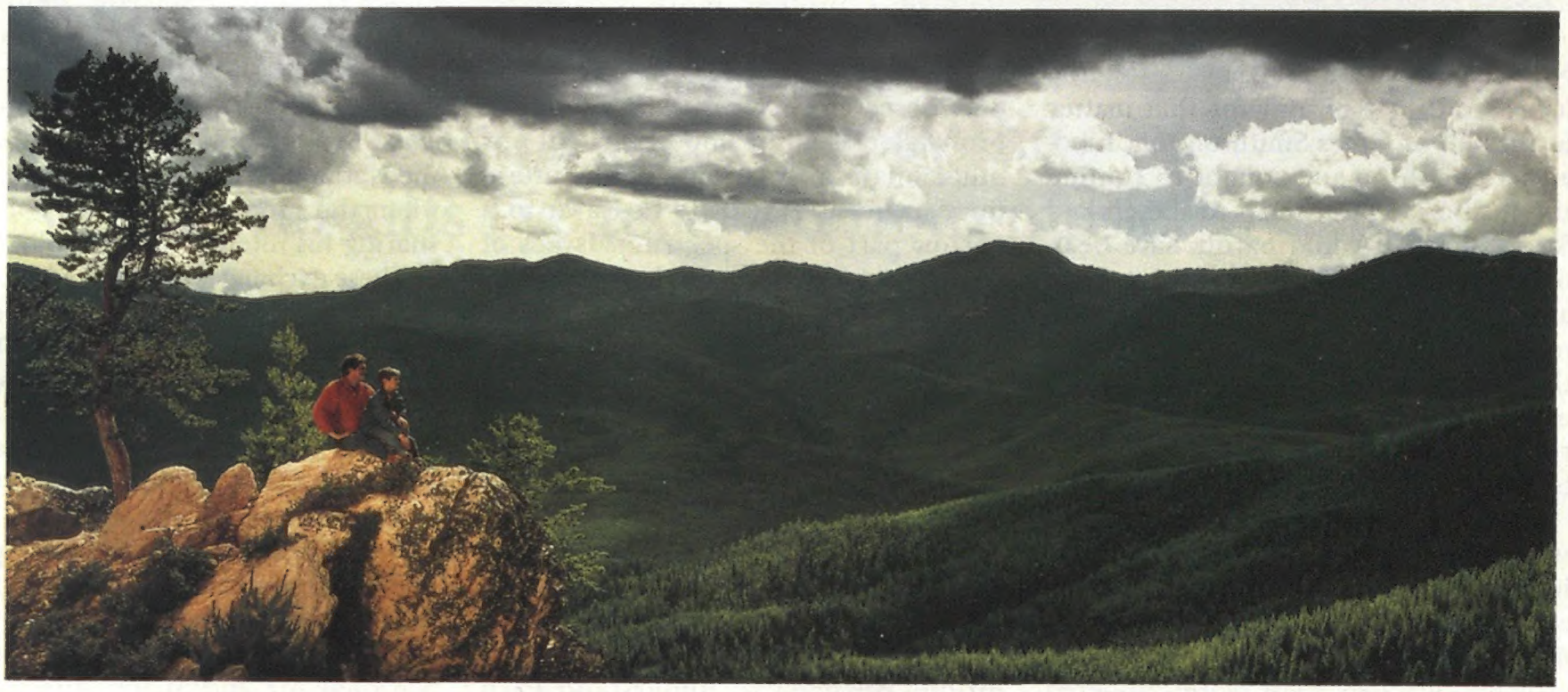
"Who's going to make sure the trees will be here tomorrow?"

"Not an easy question. But that's what my son asked the other day. He's thinking about it. Just like everybody. He wants to know if the trees will still be around when he grows up. Well, working for Georgia-Pacific like I do, I



can tell him we're doing our part. Planting new trees by the millions. Setting aside land. Making sure the trees will always be here. For everybody. Of course, I can't speak for other companies out there. But I know we're doing what's right." Steve Delfs, Forester. **Georgia-Pacific**

Secretary Adams' comments

Smithsonian horizons

In an era of downsizing, we must carefully set priorities among our diverse international activities

Nothing in the Smithsonian's founding legislation in 1846, nor for that matter in the will of James Smithson that funded its establishment, sought to confine the Institution's concerns to the United States alone. It could hardly have been otherwise. Science and scholarship have always been international. Some of our most prized collections are drawn from the history, natural history and culture of other world regions. Great exhibitions regularly move across our borders in both directions.

These are times of national budgetary stringency. A long era of sustained growth has been succeeded by a period of modest but painful downsizing. Everything on the Smithsonian's agenda, international activities included, must be reconsidered carefully. Which ones should we continue, or perhaps even strengthen, because they build on our unique strengths and comparative advantages? Which of them must be attenuated, or even terminated, to make this possible?

Our most important international cluster of scientific research has been in tropical biology. Worldwide in scope, its center of concentration is at the Smithsonian Tropical Research Institute in the Republic of Panama. Multifaceted terrestrial and marine programs there have the advantage of an enormous, indeed unique, knowledge-base developed through many decades of study, of comparably long and cordial relations with the host country, and of state-of-the-art laboratory facilities close to the field setting. The challenge of preserving biodiversity and of understanding complex, endangered ecosystems surely will continue to intensify. Hence, tropical biology seems certain to remain among our research priorities.

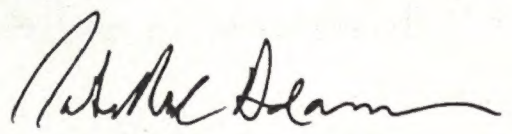
Japan is another, more broadly focused, area of the highest international priority. As many thoughtful people have observed, U.S. relations with Japan probably exceed in importance all our other bilateral relations. Public attention, to be sure, usually is drawn to a narrow part of the spectrum. Issues of competitiveness in high-technology products, and of trade imbalances reflecting unequal market access, monopolize the headlines.

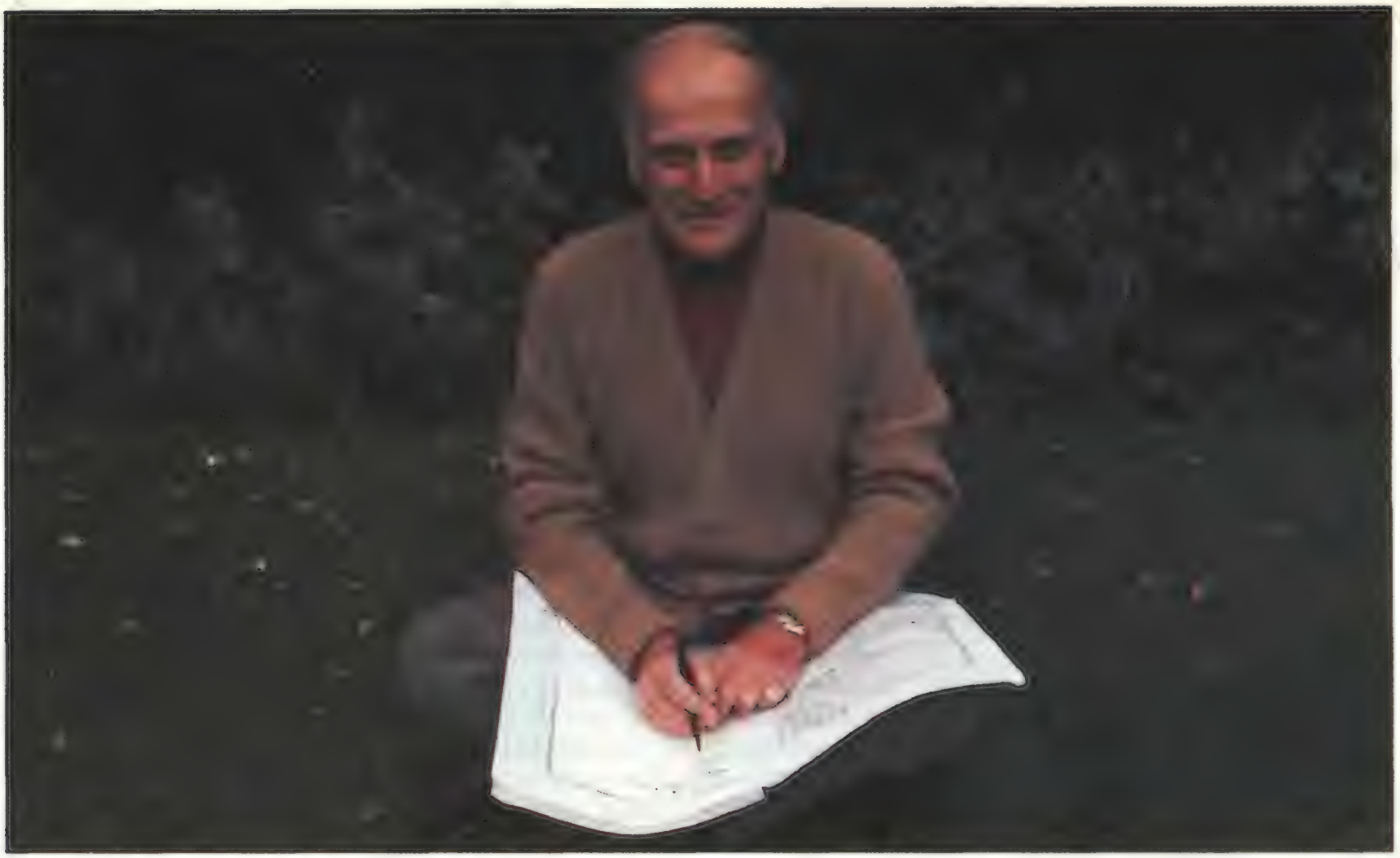
These are very real, inescapable issues. Years of negotiation, requiring the mutual respect and patience of both parties, may pass before they are fully resolved. It would be tragically shortsighted not to recognize, however, that material interests are deeply intertwined with cultural differences of perception, value and tradition. We need to understand each other better, with the confidence and familiarity of long-continuing, multiple levels of interaction. Otherwise we risk allowing our relations with this highly creative and successful ally to founder by viewing them only in terms of a purely economic and technological rivalry.

Toward this end the Smithsonian has a significant part to play. Our scientists, in fields as diverse as vulcanology, marine biology, archaeology and computer sciences, have collaborated closely with Japanese colleagues for years. The Freer Gallery of Art, known worldwide for its Asian collections, maintains close and cordial relations with many Japanese experts. Japanese conservators are at work, with government and private support, on the conservation of prized Japanese paintings in the Freer's collections. A year ago Ikuo Hirayama, noted Japanese artist, collector and philanthropist, was the recipient of our James Smithson Medal. Then this June the Smithsonian was honored to be host to the Emperor and Empress of Japan on two occasions when they visited Washington—once when they toured the Freer, and again at the National Museum of Natural History when the Emperor met with colleagues sharing his interest in ichthyology.

These exchanges culminated in a major exhibition in Japan, "The Smithsonian's America," last July and August. More than 300 objects and countless photographs and illustrations from Smithsonian collections were displayed under the sponsorship of Japan's largest newspaper and its national television network. A diverse series of concerts and dance performances accompanied the exhibition. In this way the National Museum of American History, with contributions from the National Air and Space Museum, succeeded in introducing a broad spectrum of American history and culture to an audience of millions who may never be able to come here themselves. From Commodore Perry's historic expedition in 1854, and then on to some of our great natural monuments, the vicissitudes of war, and our latest sports, styles, music, politics and technological achievements, the extraordinary synthesis that is "The Smithsonian's America" represents an unprecedented breakthrough toward greater mutual understanding.

Such understanding can only enhance U.S.-Japanese relations. Clearly, Japan, too, deserves a permanent place in any ranking of the Smithsonian's international priorities.





"I've finally found a way to repay the wonderful gifts I've received from music." *Sir Yehudi Menuhin*

When he was just two years old, Yehudi Menuhin's parents took him to hear the San Francisco Symphony Orchestra. "I remember how the sweet, lovely sound of the violin drifted up to the gallery," he recalls. "I was so enraptured that, for my fourth birthday, I asked for a violin of my own."

Menuhin got his wish and, at age seven, he made his first public appearance. By age thirteen, he had performed in New York, Paris, and Berlin, where Albert Einstein came to his dressing room, hugged him, and exclaimed, "Now I know there is a God in heaven."

Today, Menuhin's great passion is for the music academy he founded in Surrey, England. "The children who come here are like my extended family," he explains. "It gives me so much pleasure to see them grow—both as people and as musicians. I know the pressures of being a young musician, so I can relate to them in a way others perhaps cannot."

As he passes on his wisdom about music, Menuhin also stirs in his students a strong appreciation for the instruments they play—and the patient skill that goes into making them. "I teach the students that a well-made violin or piano is a work of art in itself," he says. No wonder, then, that when Sir Yehudi Menuhin selected a timepiece, he looked to an equally impressive example of craftsmanship and beauty. Rolex.

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Letters to the Editor

Last Page

Dear Sir: After reading Gerald Dumas' article in your July issue, we have reconsidered his request. If he no longer begrudges our lapse of good humor, we would be tickled to have him accept our offer, extended to his grandfather in 1929, to subscribe to *Reader's Digest* for $3.

Please inform Mr. Dumas to kindly remit $3 payable to the Reader's Digest Association Inc., tell us where he wants to receive our magazine and send the letter to me in the enclosed self-addressed stamped envelope. I will be delighted to fulfill his subscription. It is, after all, the lowest price we've offered in quite some time.

We'll try to program our computers to take their work a little less seriously.
Kenneth A. Gordon, President
Reader's Digest U.S.A.
Pleasantville, New York

Dear Sir: Earlier this year, driving somewhat over the speed limit in a little town in Wisconsin, I was pulled over, lectured and given a ticket for $85. As the patrolman started back to his car, I called him back and asked very courteously, "Do I get my senior citizen discount?"

The patrolman hesitated, then said sternly, "No, I'm afraid you don't."

I was a little bothered by his failure to get a kick out of my request, until, through my rearview mirror, I saw him lean over and speak to his seat mate, whereupon both collapsed laughing.
Walter R. Higbee
Spearfish, South Dakota

Dear Sir: Last summer I took my son to Spain and Morocco. Alas, lovely Seville is plagued with pickpockets and thieves who roam the streets on motor scooters, scooping up handbags from startled tourists. When the inevitable happened, I said, "Not a chance, pal!" Without hesitation I brought my Coach-brand hobo bag, with its weighty contents, smack under his chin and sent the poor fellow in search of easier targets.

Thinking the company would be amused by this novel use for their bag, I wrote them. Their reply? The address of the nearest Coach location for repairs.
Lee Botsford
Shell Beach, California

Dear Sir: I am 74 years old and inherited the Jell-O salad book that my mother used when I was a toddler. It had a yellowed coupon on the last page, offering six molds for ten cents. For kicks I sent it in, wondering, as did Mr. Dumas, if I would get a reply. There was no written answer, but they did send the six molds.
Dorothy M. Vincent-Saggus
Lake Placid, Florida

Commodore Perry in Japan

Dear Sir: Ranald MacDonald, honored by the Japanese as their first American teacher of English, arrived in Japan several years before Commodore Perry.

Born in Oregon Country in 1824, he was the son of an officer of the Hudson's Bay Company and a Chinook princess. When young, he befriended three Japanese sailors who had been shipwrecked off the Olympic Peninsula. Fascinated by the similarities between his mother's and the Japanese cultures, he determined to get to Japan. MacDonald signed on with a whaling ship, and when near Japan's northern islands persuaded the skipper to set him adrift in a small boat. Ashore, he was imprisoned in Nagasaki, where he was treated with great respect, even allowed servants. Learning Japanese quickly, he began teaching English to interpreters; one of his 14 students later interpreted for Perry.

In 1849 the American ship *Preble* was sent to rescue U.S. sailors who had jumped ship and been imprisoned in Japan. The *Preble* received MacDonald, in Japanese dress, as an unexpected bonus.

On the centennial of his death, a party of Japanese tourists visited his grave in Toroda, Washington; a larger group was expected last August. The Japanese know far more about him than do his own countrymen.
Madilane Perry
Republic, Washington

Dear Sir: Townsend Harris was sent to Japan not as "American counsel" but as our Consul General.
Franklyn E. Stevens
Bellingham, Washington

Dear Sir: The New England town that Manjiro lived in for nearly a decade as "John Mung" is Fairhaven. Adopted into the family of William H. Whitfield, captain of the rescuing whaler *John Howland*, he attended the town school. In 1918 his son Tochiro donated a samurai sword to our Millicent Library.

The friendship between Fairhaven and Manjiro's birthplace, Tosashimizu, continues to this day, notably in our biennial John Manjiro (as he was also known here) festival. The whole town is involved, welcoming the many Japanese who come to participate.
Terry Bigham
Fairhaven, Massachusetts

Dear Sir: Daniel Webster was never a Senator from New Hampshire, as you state. He did serve two terms as a Senator from Massachusetts but in 1851 was Secretary of State.
Robert D. Geise
Selinsgrove, Pennsylvania

Dear Sir: Francis Xavier was born a Spanish Basque, not a Portuguese. His friend Ignatius of Loyola enlisted him and five others in forming the Society of Jesus in Pa[illegible] 1534.
Inez Altamirano
Sacramento

Playgrounds

Dear Sir: The playground movement began in Prussia with Friedrich Froebel (1782-1852), who took a job teaching at a progressive school in Frankfurt. He brought to his work a respect for the child as an individual whose development should be guided by his or her own personal talents and interests. An amateur gardener, he created the term *Kindergarten* (literally, "children's garden") to describe the flowering of each child, much as the flowering of the plants he so loved. The adjoining playgrounds were places where children could realize his goal of individualized guidance and growth.

In 1850 the Prussian government banned Froebel's kindergartens and playgrounds as hotbeds of socialism and atheism, and Froebel died brokenhearted. His young widow and several of his

teachers immigrated to England, where the movement had wide acceptance. Some visiting American educators then brought Froebel's ideas back to the States, where they found a welcome in settlement houses.

Nurse Lillian Wald, the founder of New York's Henry Street Settlement, put a playground—with a large sandpile, a flower arbor, or pergola, and swings—in its backyard. The children also played gender games—baby care for the girls and manual training for the boys.

The playground movement quickly spread to the public schools, and in 1914 the governor of New York advocated that public schools should be surrounded by playgrounds at "no matter what cost."
Louisa M. Murray
Miami

Dear Sir: Some of my favorite childhood memories are of digging holes in an empty lot—we called it a fort. We needed nothing but an old shovel, some branches, a bottle of water and a ketchup sandwich. We could play all day long, until dark or dinnertime: King of the Hill or Annie Annie Over. But most of all, no grown-up's rules.

My grandchildren are also lucky, as we have a nice pond with frogs, crawfish and turtles, and old trees for forts. They get dirty and smelly, and come back with smiles on their faces.
Margaret Kuechenberg
Hobart, Indiana

Dear Sir: I've spent lots of time "creek-walking" and just hanging out on our farm with my three kids. I'm also chairman of the board of a small Montessori school. We plan to expand, and your ideas are exactly in sync with ours.

Our school has a large area covered with scrubby woods, which the children love—paths, forts, imaginary pony stables. We hope parents will agree this is a terrific asset.
Brenda Butka, M.D.
Nashville

Rockwell and Pyle

Dear Sir: My father, who is 95, has a wonderful personal library, which I loved to peruse as a child. One of the books he is most proud of—one in the King Arthur series illustrated by Howard Pyle—had been awarded him as a prize for "Best Student in Class" when he was 8.
K. Christie Vogel
El Granada, California

Dear Sir: Norman Rockwell did a number of his paintings from photographs made by his friend Harry Webb, who had a studio at 80 West 40th Street in New York City. Webb described these photo sessions as lots of fun. Friends and neighbors were recruited as models, dressed as needed for the painting, then were posed as Rockwell required.

Webb himself appears in one of Rockwell's *Saturday Evening Post* covers—a salute to the Royal Navy—as the seaman.
Anna Bertun Gerstner
Decatur, Illinois

Stan Herd

Dear Sir: The multitalented Stan Herd is also a muralist, as *Stagecoach*, adorning the south wall of our Bank IV [below], shows. Herd painted it as a tribute to that master sculptor of the West, Frederic Remington. Measuring 35 feet by 45

feet, it was dedicated to the people of Dodge City and southwest Kansas on July 14, 1979.
Jan Scoggins
Dodge City

Dear Sir: Each time I look upon *Little Girl in the Wind* I see, in her windblown hair, the distinct profile of a shaman or a chief, facing left. His graceful, plumed headdress, flowing and blending with the girl's tresses, seems to bind them together as one.

I visualize her as the reincarnation of her many Native American ancestors.
A. E. Freitag
Clearwater, Florida

Water Tunnel No.3

Dear Sir: It was the Panama Canal, not the Suez, that employed great numbers of West Indians.
Gerald R. Stine
Wichita Falls, Texas

Around the Mall

Dear Sir: The Conference on Stuff struck a chord. The Minnesota Historical Society held its first theme lunch on August 24, 1989: a "Jell-O off." The winner of the "Best Mold or Sculpture" was an underwater scene featuring gummy fish in a fishbowl of blue-green Jell-O.

The following year, entries of process cheese included a model of the Minnesota History Center (then under construction), a "Velveeta Rabbit" and a giant Velveeta pencil. Winner of the "Most Inappropriate Commingling of Ingredients in a Single Item of Food" was a prune-and-Velveeta waffle.
Candy Hart
Saint Paul

Dear Sir: Speaking of "stuff," my husband never knew a peanut butter he didn't like. On a trip to Alaska he packed a small satchel with a jar of peanut butter, crackers, cheese, a giant candy bar and sardines. I scoffed, telling him I was sure there were grocery stores in Alaska.

At 5 A.M. one day we boarded the combination caboose-passenger car on the White Pass & Yukon Railroad. None of the ten passengers had eaten breakfast, since nothing was open. When our scheduled lunch stop was delayed, my husband triumphantly brought out his stuff and handed out small but welcome snacks all around, just enough to quiet our hunger pangs and ease the way to a late lunch.
Edna D. Ivers
Fort Worth

Dear Sir: I was surprised that "s'mores," the ultimate campfire treat, weren't mentioned. Take a marshmallow roasted to gooey perfection, squish it between graham crackers with squares of Hershey's chocolate—so good you just have to have s'more!
Diana Daniel
Bend, Oregon

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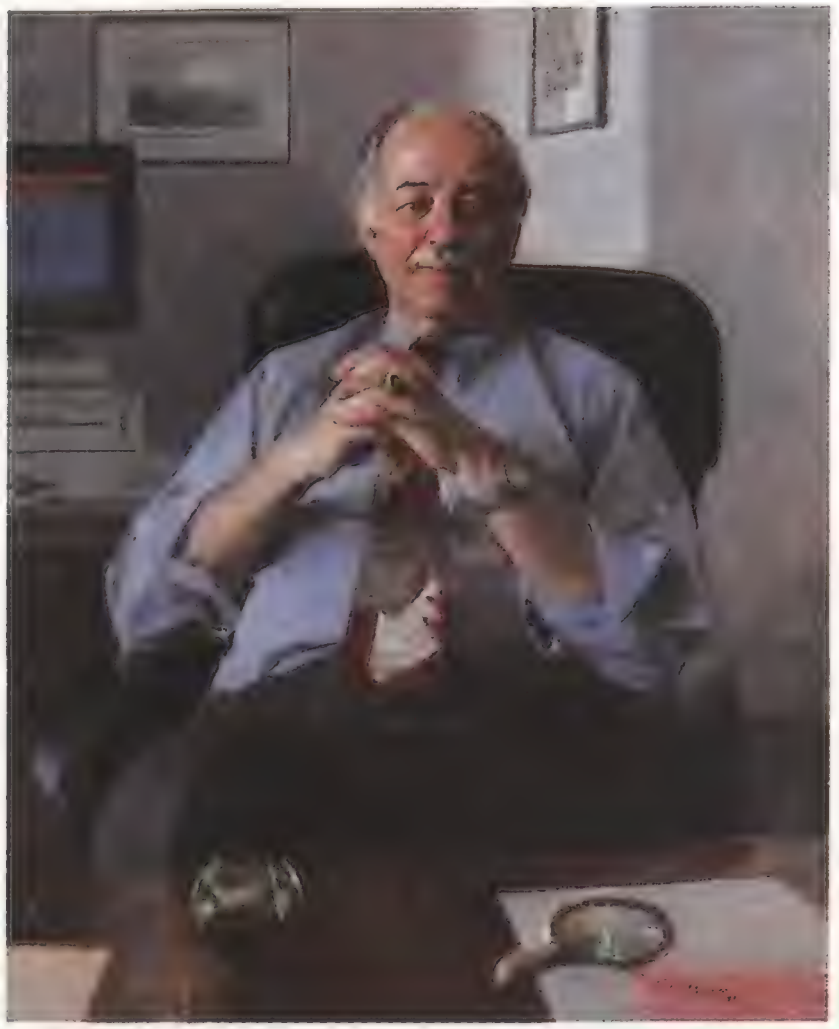
By Michael Kernan

Smithsonian Secretary Robert McCormick Adams looks to new horizons



Burton Silverman's painting of Adams, donated by friends, will join Secretaries' portraits in the Castle.

The rolled-up sleeves are his trademark. Even in his official portrait as the ninth Secretary of the Smithsonian Institution, Robert McCormick Adams sits back informally in his chair, his shirtsleeves folded neatly to the elbow.

The shirtsleeves suggest the man and seem appropriate to a scholar in his discipline, archaeology. He is happiest in old jeans, boots and a worn shirt open at the neck. At his home in Colorado he drives a dirt-caked pickup; in Washington, the world capital of the limo, he sticks to his turquoise Geo. At lunchtime in the Smithsonian Castle, he is apt to be found in a subterranean sandwich shop called the Boiler Room, where he stands in line with everybody else for a tuna sandwich and coffee to take up to his desk. In short, he is not much for show: he believes in ideas.

His decade-long tenure as Secretary, which comes to an end on September 19, will be remembered not merely for bricks and mortar and new museum initiatives—the National Postal Museum, the National Museum of the American Indian and the National African American Museum Project—but even more for his attention to the intellectual challenges confronting the Institution, its purposes and directions, its philosophy.

One idea that occupies his mind now, as he prepares to take on different challenges, is a new project: a book on the history of technology and its curious pattern of pulses and quirky shifts in direction, going all the way from the prehistoric potter who first stood his wheel on edge and rode it, to the high-tech electronics industry.

"The subject hasn't been done before in just this way," he comments. "I think I have something to say about it."

Adams certainly would. He has spent most of his 68 years in archaeology, notably in Iraq, Iran, Saudi Arabia and other areas now effectively off-limits to Western scholars—one reason why he is turning to a new field. Concentrating on the origins of systematic agriculture and the development of the city, he has studied the very earliest technologies of irrigation and settlement, and in a way his new direction is simply an extension of the old.

Mind you, this is not a retirement. Aside from the fact that he believes the Smithsonian needs "a replenishment of leadership" every ten years or so, Adams wants to get back to his "chronically unfinished research," which, he adds, "I feel a personal responsibility to complete," even if he is unable to revisit his old desert haunts.

Pretty soon he is talking about ancient bricks. Once, in the Iraqi desert when his Land Rover got stuck in the sand, he got out by building a crude track with bricks he found lying around. "There are millions of them out there," he says. "Some of them have ancient emperors' stamps on them. But you know, Saddam Hussein is rebuilding Babylon now, and he puts his own stamp on. So someday someone will find a mound with Nebuchadnezzar's bricks below and Saddam Hussein's above."

Now he is discussing his adjunct professorship at the University of California, San Diego, which he may start next spring after he has finished his book. And there is that history of the Lower Tigris Valley that needs to be finished. And the invitation to Berlin's Institute for Advanced Study next winter. And, of course, his hope to spend some time at his Colorado home with his wife, Ruth, who is semiretired as a senior adviser for the MacArthur Foundation. Incidentally, he built the house and

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quarried all of its red sandstone himself from a rock formation called Seven Castles, jeeping it down in bathtub-size chunks.

"We may keep an apartment here in Washington if we ever figure out what our income is going to be. There's plenty to do here in historical geography, if not fieldwork."

He misses the fieldwork; you can tell that just by looking at this strapping outdoorsman. For decades it was his life. The couple's daughters, Gail, Beth and Megan, used to join them on the digs in Iraq.

He gets up around 5, reads the papers ("though I don't know if I will continue to do it defensively"), accomplishes a lot in the mornings. A fast reader, he rarely reads for the sheer fun of it. He is good at jumping from one thing to another, which is fortunate.

A Chicago native who sports on his desk a graphite rod from Enrico Fermi's historic University of Chicago atomic pile, Adams belongs to the McCormick reaper clan. Trained in Navy electronics in World War II, the six-foot-two Adams naturally was assigned to shore patrol in Shanghai. For three summers he helped clear the first ski trails at Aspen. At the University of Chicago he studied physics, switched to anthropology, dropped out to work in a Ford assembly plant and a steel mill, then joined an archaeological expedition to Kurdistan. His interest in settlement and irrigation patterns took him all over the Near East and Mexico, and through the years he picked up "working-level Arabic," Spanish, German, some French, "and that's all—I don't have any special talents in that line."

After a long association with the University of Chicago—from 1982 to 1984 he served as provost—he came to the Smithsonian, bringing with him certain ideas about the role of museums in today's culture. Take the National Museum of the American Indian, due to open its Mall building in 2001, which he considers his most important achievement here, not so much for its concrete walls as for the changes in viewpoint it represents: "It's important in the sense that museums aren't seen as places of unquestioned authority but as places of debate and exchange, in which the viewers participate: a partnership of the people involved in the collections, and the staff."

The words come easily, giving little hint of the vast struggle behind the scenes, involving not only Congress and the Smithsonian establishment itself but the various communities and tribes and the factions within them. H. Richard West jr., the new museum's director, himself a Southern Cheyenne, spent months on the road talking to these groups, the tradition-minded elders and rebels of all ages. A newsletter, the *Smithsonian Runner*, was set up for, among other audiences, Native American support groups, some of whose members had to be convinced that their voices would be heard. An important turning point probably was the decision to hand over to descendants the Native American human remains that had been stuffed into museums all over the country.

"This was a national problem," Adams points out, "not just the Smithsonian's. Major adjustments were required of physical anthropologists and archaeologists. We had to learn to see these things through someone else's eyes."

Along this line, he is also proud of his work promoting "cultural diversity," a Washington code word for equitable treatment of minorities. "The Folklife Festival, as an expression of the strands that go to make up the country and the world, goes back many years," he observes, "but I think there is a new awareness now. Minorities are concerned with how they're represented. The white-coated curator who can't be questioned is gone. Curators now are working with communities of people who have a real stake in how their ancestors are seen."

He is glad that people are moving away from the "nation's attic" notion of the Smithsonian, though there will always be such icons as the huge Star-Spangled Banner from Fort McHenry,

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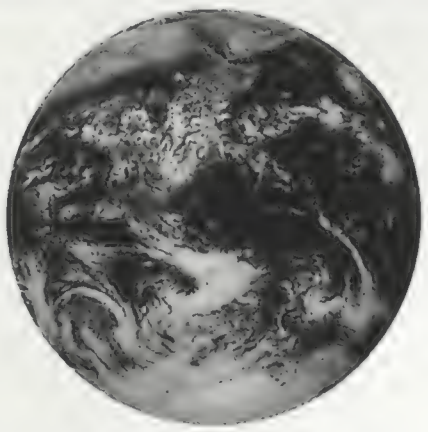

Iron and the Earth

By Hitoshi Takeuchi

Iron is one of the most common elements of the earth and the solar system. The earth's surface is a thin crust about 62 miles thick, and iron is one of its main constituents. Other common elements include oxygen and silicon in rocks, and aluminum.

If the earth is compared to an egg, the yolk would be the earth's core, which is mainly liquid iron. The egg white would be the mantle, and the thin shell would be the crust which supports life. The iron core rotates against the mantle and induces electromagnetism, giving the earth its dipolar magnetic field.

Iron is one of the oldest elements in the universe. It was created by nuclear fusion inside first generation stars at the beginning of the universe, about 15 billion year ago.

The second generation of stars was created by the exploded debris mixing with the considerable amount of hydrogen that was already in space and the resulting nuclear fusion created elements up to bismuth (atomic number 83). The explosion of this second generation of stars created transuranium elements (those elements with an atomic number higher than the 92 of uranium)

Given this explanation for the formation of the elements, the sun is at least a third generation star. If our sun was a first generation star, none of the heavy elements, such as uranium that were scattered in space by the explosion of the first and second generations, would be present in the sun or our solar system. Iron is abundant in the solar system because it was the last element made in the first generation of stars.

Iron appears in the writings of Israel's King David around 1,000 B.C. and in those of Homer around 800 B.C. The iron they wrote about was probably siderite iron. Techniques for producing iron in large quantities were developed in the 1730s when coke was first used as a reducing agent. Foundry technology took another massive step forward with the introduction of the Bessemer Process for steel in the middle of the 19th century and then again with modern steel manufacturing techniques.

About the Author:
Hitoshi Takeuchi, honorary professor of geophysics, University of Tokyo, is currently editor-in-chief of the Japanese science magazine, NEWTON, and has published more than 350 books.

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as well as the robed statue of Washington and other such curiosities that will probably have to be kept around forever.

"And what do you do about the *M*A*S*H* thing?" he asks, referring to the enormously popular exhibit built around the long-running TV series. He hates to see the great institution trivialized with showbiz marginalia like J. R.'s hat from the TV show *Dallas*, but when the curators report that people line up around the block for *Star Trek* exhibits and such, he says, "How the hell do you define pop culture anyway? Who is the Secretary to talk to specialists in that area and say, 'I disagree with you, you're being a philistine.' No, you can't operate at that level of detail."

Similarly, though he believed that in "The West as America"—a controversial show which argued that some famous paintings of Indians and Western pioneers contain racist and imperialist messages—curators may have gone somewhat overboard in their tendency to lecture the viewers, he had no disagreement with their revisionist stance, even as he took much of the heat for the exhibition. The uproar at the National Museum of American Art in 1991 reverberated in the national press for months. Eventually, the tone of the labels was made less strident and preachy, though the show continued its run.

There were those who thought Adams failed to defend the best standards of accuracy against the "right to speak out" of half-baked scholarship. "But basically," he says, "the curators were doing what they ought to be doing. Also, they confronted their critics, they held symposia, they had a book of comments. And that in itself is another form of dialogue, bringing the audience into the act."

The question of what a museum should be shows up in the case of the National Museum of Natural History. "The world changes, and you're in trouble. We had to close the African ethnography and the physical anthropology exhibits. And we need an exhibit on plate tectonics, which in the last 30 years has changed the way we think of the history of the Earth. But where do you get the money to do all this?"

This has been his greatest disappointment: the recession and the inability to find money for research. The growing polarization of America—arts versus sciences, the conflicting expectations of curators, Congress and the public—has been a continual headache.

On the other hand, "it's been a great job, and I'll miss the unexpectedness, the complexity of it, every day something coming at you from a totally different direction. That's why I called my monthly column *Smithsonian horizons*, because the issues go all the way around, 360 degrees."

The great era of building may be over for the Smithsonian Institution. This is a time, says Bob Adams, not merely to consolidate but to study more profoundly those incredible 140 million catalogued items already in the Smithsonian: their context, their provenance, indeed their very meaning. Not merely to collect, as he would say, but to think.

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Phenomena, comment and notes

In our images of Neanderthals, we haven't always let the facts get in the way of what makes us feel best

Not long ago, I opened my morning newspaper to the sports section to find a column by Thomas Boswell. He was lamenting the fact that the National Basketball Association seems to have abandoned the high-flying, high-scoring playing style of recent decades for the defensive, push-and-shove game more common in the 1950s. "Unfortunately," wrote Boswell, "the NBA has returned to its neanderthal roots."

What caught my attention was not Boswell's opinion of the NBA (I am an indifferent basketball fan who lost interest when Larry Bird and Michael Jordan retired), but his choice of an adjective. Since I write frequently about human evolution, the word "Neanderthal" has a very specific meaning for me. First discovered in 1856, the Neanderthals were large-brained, heavily muscled archaic humans who inhabited Europe and western Asia in the Middle Paleolithic beginning around 150,000 years ago and disappeared some 35,000 years ago, when more modern-looking populations entered the region. Among the physical characters that distinguish them from other early humans are the long, low sweep of the Neanderthal cranium, their big noses and faces, and a host of features in their skeletons relating to their prodigious muscle strength.

This specific version of humanity is not what Boswell was referring to with that loaded adjective. (I don't know when the NBA was founded, but I am sure it was well after the Middle Paleolithic.) His metaphorical use of "Neanderthal" is much more common, its connotation instantly understood by any reader.

"The Neanderthal who whacked [Nancy] Kerrigan's knee, a male thug. . .," growls columnist Mike Royko. Another writer calls a local politician, in Detroit, "a hopeless Neanderthal," while a woman writing in to Ann Landers refers to "my Neanderthal brother-in-law." We don't need any more information about the guy to get the gist of his personality, or at least the way his sister-in-law sees it. The single word works just fine. Brutish. Dim-witted. Unenlightened—or more accurately, incapable of enlightenment. How has the name of an ancient hominid come to mean all this? Note that Royko does not call Kerrigan's assailant an "australopithecine," nor is the local politician reviled as "a hopeless *Homo habilis.*" Both of these terms refer to ancient humans millions of years further removed in time from us, and much more apelike in form than the Neanderthals were. Whether or not they went extinct, the Neanderthals had brains as big as ours and a cultural acuity far exceeding any earlier ancestor. So why is their reputation so poor?

The popular image of Neanderthals was brought up recently during a symposium at the Society for American Archaeology's annual meeting, held at the Disneyland Hotel in Anaheim, California—a fitting venue, considering how much of our view of them is rooted in fantasy. According to Australian archaeologist Stephanie Moser of Sydney University, who coorganized the symposium, the seeds of the stereotype were firmly planted long ago. In 1908 a new Neanderthal skeleton was found near the village of La Chapelle-aux-Saints in southern France. A year later, a rendition of what the specimen would have looked like alive was published in the French newspaper *L'Illustration* and in the *Illustrated London News.* The work of an artist named Frantisek Kupka, the drawing depicts a hideous creature indeed: clasping a club in one hand and a great rock in the other, the Neanderthal lurks outside the entrance to his cave, the ground around him littered with the bones of past meals. His hunkered posture and the drooling scowl across his simian mug suggest a modus operandi of "bash in head now, ask questions later."

What was novel about this image was not its rank savagery, but the claim, made explicit in accompanying captions and text, that the rendering was "an accurate reconstruction of the Prehistoric Cave-Man" based on expert anthropological opinion. The scientific adviser to the artist had been none other than Mar-

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A skeleton discovered in France in 1908 led to the first—and wildly different—images of Neanderthals. The brute above was visualized by Marcellin Boule, the more-human toolmaker at right by Arthur Keith.

cellin Boule, the eminent French paleontologist officially charged with describing and analyzing the La Chapelle fossil. Boule had no use for Neanderthals, and his prejudice was borne out in the way he read their bones. Though the La Chapelle skull might have housed a brain as big as an average Frenchman's, Boule declared it lacking in volume in precisely the areas, such as the frontal lobes, believed to be associated with higher mental functions. Not surprisingly, these low-browed brains had been capable of only the most "rudimentary and miserable" tool culture, and precious little else. The skeleton below the neck was even better testimony to the creature's "brutal aspect." Far from resembling living humans, the beast had walked with bent knees and a shambling gait, his head slung forward on a squat neck, his big toe splayed out, chimpanzee-like, to the side.

This was the "scientific" portrait of the La Chapelle Neanderthal visually presented to the public in 1909. But just two years later, the *Illustrated London News* published another version based on the exact same skeleton. This time the Neanderthal appeared remarkably human, even noble, sitting quietly by a hearth surrounded by the tools of his hunting trade like a Greek hero glimpsed in a private moment at home. Curiously, this revised version of Neanderthal *also* came with a certificate of scientific authority attached. In the accompanying text, Arthur Keith, the rising star of British anthropology, claimed that Kupka and Boule had misrepresented the Neanderthal's face as more similar to a gorilla's than a man's. Furthermore, there was no indication in the bones of La Chapelle that the creature would have walked any different than modern people. After a careful study of the skeleton, Keith concluded that "it becomes very evident that there was very little more of the ape in the Neanderthal type of man than in his modern representative."

Like Boule's earlier version, the revised portrait of Neanderthal sanctioned by Keith was meant to be an unbiased truth. Neither of the drawings was the least bit objective. As Stephanie Moser points out, both were soaked in theories expounded by their respective experts—Keith's view at the time that the Neanderthals were part and parcel of the lineage leading to modern human beings, and Boule's opposing belief that they were an inferior side branch fit only for extinction. Whatever happened to the Neanderthals as a population—and anthropologists still do not know the answer to that—Boule was certainly wrong about the La Chapelle skeleton itself. Its misshapen legs turned out to be a sign of advanced arthritis, rather than a key to their owner's primitive nature. Other features, such as the splayed big toe, seem to have been invented out of whole cloth. Nevertheless, it is Boule's drooling beast, rather than Keith's noble hunter, that dwells on in our mental archives, ready to supply an evocative epithet whenever somebody cuts us off in traffic or makes a stupid remark.

There are a number of possible explanations for the beastly image's tenacity. Lori Hager of Stanford University, a participant in Moser's symposium, believes that part of the answer is merely the happenstance of time and place. The Neanderthals may not be the most brutish of our ancestors—far from it—but they were the first to be found, the earliest discoveries coinciding with the tormenting debut of Darwinian evolutionary theories in the late 19th century. European society was not yet ready to accept its link to lower primates, so no wonder "Neanderthal Man" was ill-received when he started popping up uninvited in European backyards. To make matters worse, the more romantic version of Neanderthal soon lost its loudest cheerleader when Arthur Keith changed his mind and threw his considerable weight behind Boule's theory instead. But perhaps it would not have made much difference anyway, says Stephanie Moser—the "compelling qualities" of the savage were too powerful to overcome.

And here we come to the root of the Neanderthals' problems. Clearly, what makes the brute image so compelling must have more to do with us than with the Neanderthals themselves, who bear about as much resemblance to Boule's monster as a North American field mouse does to Disney's Mickey. What holds the image intact, I suspect, is the deep-seated fear that in spite of all that separates us from the rest of animal creation—our intelligence, our civilization, our moral order—we have not con-

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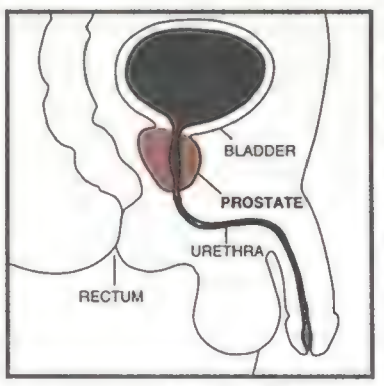

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Treatment options for BPH
There are three main treatment options for BPH:

- **Program of monitoring or "Watchful Waiting".** If a man has an enlarged prostate gland and no symptoms or if his symptoms do not bother him, he and his doctor may decide on a program of monitoring which would include regular checkups, instead of medication or surgery.
- **Medication.** Your doctor may prescribe PROSCAR for BPH. See **"What PROSCAR does"** below.
- **Surgery.** Some patients may need surgery. Your doctor can describe several different surgical procedures for BPH. Which procedure is best depends on your symptoms and medical condition.

What PROSCAR does
PROSCAR lowers levels of a key hormone called DHT (dihydrotestosterone), which is a major cause of prostate growth. Lowering DHT leads to shrinkage of the enlarged prostate gland in most men. This can lead to gradual improvement in urine flow and symptoms over the next several months. However, since each case of BPH is different, you should know that:

- Even though the prostate shrinks, you may NOT see an improvement in urine flow or symptoms.
- You may need to take PROSCAR for six (6) months or more to see whether it helps you.
- Even though you take PROSCAR and it may help you, it is not known whether PROSCAR reduces the need for surgery.

What you need to know while taking PROSCAR
- **You must see your doctor regularly.** While taking PROSCAR, you must have regular checkups. Follow your doctor's advice about when to have these checkups.
- **About side effects.** Like all prescription drugs, PROSCAR may cause side effects. Side effects due to PROSCAR may include impotence (or inability to have an erection) and less desire for sex. Each of these side effects occurred in less than 4% of patients in clinical studies. In some cases side effects went away while the patient continued to take PROSCAR.

  Some men taking PROSCAR may have a decrease in the amount of semen released during sex. This decrease does not appear to interfere with normal sexual function. Rarely, some men have reported breast swelling and/or tenderness or allergic reactions such as lip swelling and rash.

You should discuss side effects with your doctor before taking PROSCAR® (Finasteride) and anytime you think you are having a side effect.

- **Checking for prostate cancer.** Your doctor has prescribed PROSCAR for symptomatic BPH and not for cancer—but a man can have BPH and prostate cancer at the same time. Doctors usually recommend that men be checked for prostate cancer once a year when they turn 50 (or 40 if a family member has had prostate cancer). These checks should continue while you take PROSCAR. PROSCAR is not a treatment for prostate cancer.
- **About prostate specific antigen (PSA).** Your doctor may have done a blood test called PSA. PROSCAR can alter PSA values. For more information, talk to your doctor.
- **A warning about PROSCAR and pregnancy.**

  PROSCAR is for use by MEN only.

  PROSCAR is generally well tolerated in men. However, women who are pregnant, or women who could become pregnant, should avoid the active ingredient in PROSCAR.

  If the active ingredient is absorbed by a woman who is pregnant with a male baby, it may cause the male baby to be born with abnormalities of the sex organs. Therefore, any woman who is pregnant or who could become pregnant must not come into direct contact with the active ingredient in PROSCAR.

Two of the ways in which a woman might absorb the active ingredient in PROSCAR are:

Sexual contact. Your semen may contain a small amount of the active ingredient of the drug. If your partner is pregnant, or if you and your partner decide to have a baby, you must stop taking PROSCAR and talk to your doctor. If your partner could become pregnant, proper use of a condom can reduce the risk of exposing her to your semen (discuss this further with your doctor).

Handling broken tablets. Women who are pregnant or who could become pregnant must not handle broken tablets of PROSCAR.

PROSCAR tablets are coated to prevent contact with the active ingredient during normal handling. If this coating is broken, the tablets should not be handled by women who are pregnant or who could become pregnant.

If a woman who is pregnant comes into contact with the active ingredient in PROSCAR, a doctor should be consulted. Remember, these warnings apply only if the woman exposed to PROSCAR is pregnant or could become pregnant.

How to take PROSCAR
Follow your doctor's advice about how to take PROSCAR. You must take it every day. You may take it with or between meals. To avoid forgetting to take PROSCAR, it may be helpful to take it the same time every day.

Do not share PROSCAR with anyone else; it was prescribed only for you.

Keep PROSCAR and all medicines out of the reach of children.

FOR MORE INFORMATION ABOUT 'PROSCAR' AND BPH, TALK WITH YOUR DOCTOR. IN ADDITION, TALK TO YOUR PHARMACIST OR OTHER HEALTH CARE PROVIDER.

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quered the beast within. To reassure ourselves, we abstract this interior animal and thrust it safely outside instead, where it can be seen not as part of what we are, but the very definition of what we have risen above. This psychological delamination of the civilized self from the animal one is literally and intentionally dehumanizing, leaving Neanderthal devoid of brains and virtue, a murderous Mr. Hyde distilled from the dark, hidden recesses of the good Dr. Jekyll. It is no wonder that in illustrated prehistory Neanderthal has played this role of the primitive "Other," rather than some apelike biped from the distant past who, superficially, might seem more suited to the part. So close to us in time and development, he is keenly, potently, dangerously *almost* human.

"The closer to modern humans in time we get," says Lori Hager, "the more essential it is to define the primitive, to know who the Other is, so that we might define ourselves as above them."

Is there any hope for the Neanderthal image? Maybe a little. New dioramas at the American Museum of Natural History in New York City and the Maxwell Museum of Anthropology in Albuquerque, and one to open at the Smithsonian's National Museum of Natural History, show our ancestors to be much more like us than some previous displays, and artists are openly challenging the traditional view. Such better-informed depictions have been waved in front of our eyes before, however, with little effect on the popular stereotype: over the decades it seems to have ossified into cliché, and no amount of new evidence and interpretation can soften it.

On the other hand, we can be reminded to be careful of what we are doing. While it may be psychologically satisfying to look down on a version of humanity from another time, it is morally repugnant, and politically disastrous, to unwittingly transfer the same mindset to living humans from other places. More than one anthropologist at the Anaheim meeting pointed out that Boule's disturbingly durable version of the drooling savage beast was, and is, blatantly racist. The only real difference between this particular form of racism and that oppressing any ethnic group today is that the victims are no longer around to feel the pain of it.

James Shreeve

The author's book on Neanderthals and modern people will appear next year.

Smithsonian highlights

Planning a Smithsonian visit?

Receive a special free Associates' Planning Packet. Write Smithsonian Information, Smithsonian Institution, Washington, D.C. 20560, or call (202) 357-2700, daily, 9 A.M. - 4 P.M.; for callers with communication impairments, TTY: (202) 357-1729. *Note:* Parking near Smithsonian museums is limited. The convenient Metrorail subway system has parking available at some stations (details in packet).

Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M.- 4 P.M. daily—in the Smithsonian Castle.

Note: The Castle will be closed to the public and Associate members on September 19 for the installation of the Smithsonian Institution's tenth Secretary, Ira Michael Heyman.

Extended summer hours

The American History, Natural History and Air and Space museums are operating on extended hours, 10 A.M. - 6:30 P.M. daily, through Labor Day, Monday, September 5. Regular Hours, 10 A.M. - 5:30 P.M., resume Tuesday, September 6. Hours at the National Zoo are 9 A.M. - 4:30 P.M. daily for buildings, and 8 A.M. - 8 P.M. for grounds, through October 15. Other Smithsonian museums are generally open 10 A.M. - 5:30 P.M. daily.

The Court dining room

Located in the National Museum of Natural History, the Court dining room offers buffet service daily, 11 A.M. - 3 P.M.

National Hispanic Heritage Month

The Smithsonian will celebrate Hispanic Heritage Month from September 15 through October 15 with a variety of programs and activities. For information call (202) 357-2700, 9 A.M. - 4 P.M. daily. For 24-hour recording call (202) 357-4577 (English) or (202) 633-9126 (Spanish) beginning September 1.

The Contributing Membership

The Contributing Membership supports the Institution's work in education, research and collections programs. Partially tax-deductible contribution categories are: Supporting, $60 (available only to non-D.C. area residents); Donor, $125; Sponsoring, $300; Sustaining, $600; Patron, $1,200; James Smithson Society, $2,000. Members enjoy special benefits including Smithsonian publications, the engagement calendar, museum openings and behind-the-scenes tours. For more information write to The Contributing Membership, 1100 Jefferson Drive, S.W., Smithsonian, Washington, D.C. 20560, or call (202) 357-1699.

Paint the town red.
Or let us do it for you.

Every year, they come here to celebrate their anniversary. To the heart of Mexico's art community, where artists have felt the inspirational pulse of colonial Mexico for centuries. Each visit, they enjoy something unique to the Colonial Cities of Mexico. Painters who bring the beauty of the landscape alive, with its stone-paved streets and ornately carved doors. Handcrafted pottery reflecting the blues and greens of this carefully preserved city. And not too far away, they can discover dozens of other cities that invite you to embrace the soul of colonial Mexico. There are many tours and many ways of enjoying the Colonial Cities. See your travel agent for details and reservations. For your free vacation kit, call 1-800 TO BEGIN (1-800-862-3446).

The Colonial Cities of Mexico

Acámbaro
Aguascalientes
Bahías de Huatulco
Boca del Río
Campeche
Coatepec
Córdoba
Dolores Hidalgo
Durango
Ezequiel Montes
Guadalajara
Guanajuato
Irapuato
La Piedad Cavadas
Loreto
Mérida
Mexico City
Morelia
Nuevo Vallarta
Oaxaca de Juárez
Palenque
Puebla
Puerto San Blas
Querétaro
Saltillo
Salvatierra
San Andrés Cholula
San Cristobal de las Casas
San Juan de los Lagos
San Luis Potosí
San Miguel de Allende
San Pedro Cholula
Taxco de Alarcón
Tepic
Tequesquitengo
Tlaxcala
Tlaxco
Uruapan
Valladolid
Veracruz
Zacatecas
Zapopan

The Colonial Cities of Mexico.
Where It All Began. Where It All Begins.

Historic Cullinan blue diamond necklace is on display at NMNH through September.

Special September exhibits, events

National Museum of African Art
Beaded Splendor (through October 9) Show explores how beads have been incorporated into African dress and regalia. See *Highlights continued,* page 31.
Face of the Spirits: Masks from the Zaire Basin (through September 25) The complex masking traditions and diverse cultures of the peoples of the Zaire Basin.
Images of Power and Identity Permanent exhibition features 100 masterworks from the collection.
Royal Benin Art in the Collection of the National Museum of African Art (runs indefinitely) Royal commemorative heads, figures, plaques, from the 15th to 19th century.

Arthur M. Sackler Gallery
Landscape as Culture: Photographs by Lois Conner (through May 29, 1995) Large-format platinum prints by the contemporary American-born photographer depict Asia's landscape and architecture.
A Mughal Hunt (through November 27) Show unlocks identity of a 17th-century painting from India's Mughal dynasty.
Metalwork and Ceramics from Ancient Iran (runs indefinitely) Artifacts created in western Iran from 2300 to 100 B.C.
Sculpture of South and Southeast Asia (runs indefinitely) Works from Cambodia, India, Pakistan and Tibet.
The Arts of China (runs indefinitely) More than 200 objects span 6,000 years.

Freer Gallery of Art
Beyond Paper: Chinese Calligraphy on Objects (through April 16, 1995) Clay, lacquer, metal, jade, bamboo, wood, horn, objects date from the 7th to 19th century.
Masterpieces of Chinese Calligraphy (through February 20, 1995) Works represent all four major scripts and the four primary formats.
Ancient Egyptian Glass (runs indefinitely) Fifteen small, jewel-like vessels made during the second millennium B.C.
Luxury Arts of the Silk Route Empires (runs indefinitely) Adjoining galleries showcase objects from the Freer and Sackler collections.

National Air and Space Museum
Aerial Inspirations: The Silk Batiks of Mary Edna Fraser (September 9 - May 1, 1995) Large-scale silk batiks by the contemporary pilot-artist portray her vision of geographic sites in the United States.
Where Next, Columbus? Permanent exhibit takes a look at the scientific, technological, economic, ethical and political issues involved in future space travel.
Beyond the Limits: Flight Enters the Computer Age Major gallery explores the computer revolution in aerospace.
Destiny In Space (10:45 A.M., 1 P.M., 3:15 P.M., 5:25 P.M. daily) New Imax film focuses on human and robotic space exploration.
Legend, Memory and the Great War in the Air Permanent installation examines the reality of aviation in World War I.

National Museum of Natural History
Spiders! (through January 2, 1995) Revealing look at these eight-legged master builders—live and mounted specimens, games, videos, photographs, spider myths.
The Tongass: Alaska's Magnificent Rain Forest (through September 11) SITES photography exhibit captures the beauty and biological diversity of this old-growth, temperate-arctic rain forest.
Giant Squids Permanent installation showcases the world's largest invertebrates—rare specimens, photographs.
O. Orkin Insect Zoo Newly renovated insect zoo features various insect habitats, an unusual look at insects in your home and an African termite mound.

National Zoological Park
What's New at the Zoo? An engaging new generation of animals has taken up residence at the Zoo this past year. Look for such additions as Kumari, an elephant calf born in December, Kigali, a 3-month-old gorilla, four infant Komodo dragons, and a brand-new blesbok.
Amazonia Permanent installation re-creates a microcosm of the world's largest rain forest and river habitat, and explores its richly diverse ecosystem.

National Museum of American History
Balloons: The First Decade of Flight, 1783-1793 (September 2-April 1, 1995) Books and objects drawn from the collections of the Smithsonian Libraries.
Public Health Nursing, 1893-1993: A Photographic History (September 13-January 2, 1995) Images depict functions, achievements, of visiting nurses associations.
Seeing is Believing: The Photography of the Civil Rights Movement (through September 11) Show bears witness to the struggle for racial equality in the United States.
The Segesser Hide Paintings (through October 30) Mural-size 18th-century buffalo-hide paintings are two of the earliest-known depictions of conflicts involving North American Indians and Europeans.
Science in American Life New permanent exhibition tracks advances and discoveries in science over the past 125 years and features a hands-on science center.
American Encounters Ongoing exhibit focuses on the American Indian, Hispanic and Anglo-American cultures of New Mexico's Upper Rio Grande Valley.
First Ladies: Political Role and Public Image Permanent installation looks at the various roles of our First Ladies.
Information Age: People, Information and Technology Permanent show traces 150-year history of information technology.

Porcelain plaques adorn 1826 Sèvres jewel cabinet now at the Cooper-Hewitt.

"Among the Great Whales" IS A Special Expedition.

Find Out Why.

Curious whales often approach us. It's a gentle encounter, not really understood, and certainly not soon forgotten. *Ship's Registry: U.S.*

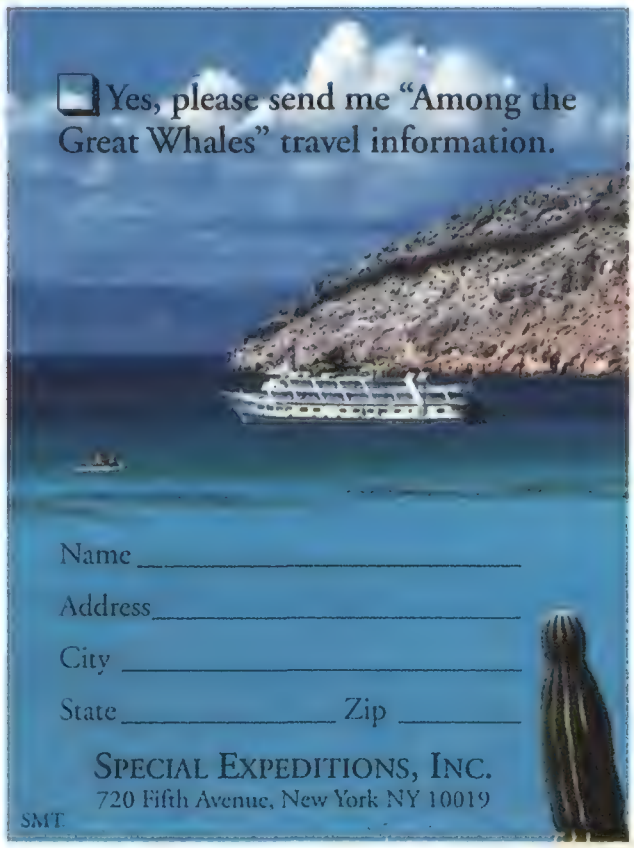
Our voyages "Among the Great Whales" take place when thousands of gray whales migrate to Baja California's Pacific lagoons (January to April) to give birth and begin a new cycle of life.

On the Baja peninsula's other side is the Sea of Cortez, the "richest sea in the world." Aboard our comfortable 70-passenger ship SEA LION, in the company of a carefully selected team of naturalists, you'll explore the countless mysteries of this remarkable region — in the span of just ten days.

You'll snorkel with sea lions, hike on uninhabited islands and learn the ways of desert animals and plants. And, of course, you'll encounter whales, the gentle giants which thrive in these waters.

If you are intrigued, please see your travel agent or write or call us today at 1-800-762-0003.

SVEN-OLOF LINDBLAD'S
SPECIAL EXPEDITIONS



Special Expeditions is a recipient of the 1994 ASTA/ Smithsonian Magazine Environmental Award.

National Postal Museum
The Smithsonian's newest museum, located next to Union Station on Capitol Hill, presents exhibits tracking the history of the nation's mail service—from the Colonial Post and the Pony Express, to the beauty and lore of stamps.
Unwelcome: Moritz Schoenberger and the S.S. St. Louis (September 15-November 1, 1995) Letters, documents and photographs of a Holocaust survivor who traveled aboard the *S.S. St. Louis* with Jewish refugees in 1939.
Gems of Hawaii: The Honolulu Advertiser Collection (through September 26) Rare stamps and covers illustrate the history of the Hawaiian Kingdom.

Hirshhorn Museum & Sculpture Garden
Felix Gonzalez-Torres (through September 11) Minimal, interactive, mixed-media installations by the Cuban-born, New York-based artist.
The Collection Reviewed: Thomas Eakins (through September 11) Show honors the renowned Philadelphia realist on the 150th anniversary of his birth.
Directions—Jeanne Dunning (through October 16) Works in color by the Chicago-based contemporary photographer.

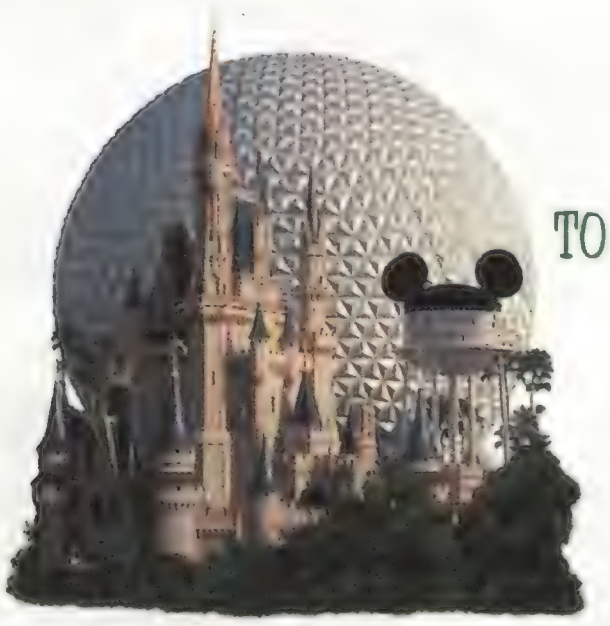
National Museum of American Art
Man on Fire: Luis Jiménez (September 16 - January 2, 1995) Fiberglass sculptures and related graphics by the contemporary Mexican-American artist.
Works by Jesse Treviño (September 16 - January 8, 1995) Paintings and drawings by the San Antonio realist depict diverse aspects of Mexican-American culture.
Folk Art Across America (runs indefinitely) Installation drawn from the museum's permanent collection recognizes the creativity of self-taught artists.

Renwick Gallery
American Crafts: The Nation's Collection (runs indefinitely) Selection of 19th- and 20th-century works from the permanent collection by nationally prominent artists in a variety of craft media—glass, clay, fiber, metal and wood.

National Portrait Gallery
Gertrude Käsebier, Photographer (through October 2) Images by the turn-of-the-century pioneer who helped establish photography as a fine art.
Art and the Camera, 1900-1940: Pictorialist Photographs from the National Portrait Gallery Collection (through December 11) The work of such photographers as Alfred Stieglitz, Edward Steichen, Doris Ulmann and Edward Weston.
Recent Acquisitions (through December 4) Portraits of notable Americans selected from recently acquired works.

Anacostia Museum
The Art of Dennis Rivera (September 18-November 6, 1995) Works by the contemporary Puerto Rican painter and printmaker focus on his homeland, and the Caribbean and its black heritage.
Black Mosaic: Community, Race and Ethnicity among Black Immigrants in Washington, D.C. (through August 1, 1995) Oral histories, art, photographs, other materials, reveal cultural diversity.

Arts and Industries Building
Imagining Families: Images and Voices (through March 1, 1995) Inaugural exhibition of the National African Ameri-



TO GET BACKSTAGE AT WALT DISNEY WORLD® RESORT,

PRESENTING THE "BEHIND THE SCENES" VACATION PACKAGE FOR AMERICAN EXPRESS® CARDMEMBERS.*

For the first time ever, Cardmembers can experience a whole new side of the Walt Disney World® Resort.

You'll witness the backstage locations where thousands of people turn the fantasy into reality.

Choose the "Inside the Magic Kingdom®" Tour, which takes you through the Magic Kingdom® Park and the tunnel system beneath it, the parade float preparation center and the topiary production field at the tree farm.

Or take the "Inside Disney Animation" Tour, where you'll learn how Disney animated features are brought to life.

Walt Disney World©

Plus you'll see the classics of tomorrow being created today. And you'll even get to try your hand at painting a cel of Mickey Mouse himself.

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Two Chairs, Trees and Plants by Silvia Ordóñez is in SITES' "Mexico: A Landscape Revisited," opening September 30 at Mexican Cultural Institute, Washington, D.C.

can Museum Project presents the work of 15 American photobiographer-artists commenting on race, class and gender.

Discovery Theater

Little Red, A Boy, and the Wolf (September 13 - October 1) Performances: Tuesday-Friday 10 and 11:30 A.M.; Saturday, 11:30 A.M. and 1 P.M. Live theater for young audiences. (Recommended for PreK and K only.) For reservations call (202) 357-1500 (voice or TTY).

S. Dillon Ripley Center, International Gallery

Talents of the Brush: Jill Sackler Chinese Calligraphy Competition (through September 25) Prizewinning entries from the 1990 and '92 competitions held in Beijing.

Concourse and Rotunda Gallery

Sculptures from the Flames: Ceramics by Gustav and Ulla Kraitz (through November 27) Swedish ceramic sculptures noted for their geometric purity.

Cooper-Hewitt Museum (New York)

The Structure of Style: Dutch Modernism and the Applied Arts 1880-1930 (September 13 - February 19, 1995) Exhibition

ALL YOU NEED TO KNOW ARE THE MAGIC WORDS:

The Official Card of Walt Disney World®

The tour of your choice, presented by Disney University Seminars, is included when you use the American Express® Card to purchase the Walt Disney World® Resort "Behind the Scenes" Vacation Package.

The package includes a stay of four or more nights at a participating Walt Disney World® Resort hotel. Plus unlimited admission to all Walt Disney World® attractions and use of Walt Disney World® transportation systems throughout your stay.

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WALT DISNEY WORLD RESORT HOTELS. 4-NIGHT MINIMUM STAY REQUIRED. ADVANCE RESERVATIONS ARE REQUIRED AND SUBJECT TO AVAILABILITY. SOME BLACKOUT DATES APPLY.
†ONE FANNY PACK AND PHOTO PER GROUP. ©1994 AMERICAN EXPRESS TRAVEL RELATED SERVICES COMPANY, INC. ©1994 THE WALT DISNEY COMPANY.

features turn-of-the-century Dutch decorative and applied arts.
A Royal Gift: The 1826 Porcelain Jewel Cabinet (through January 22, 1995) Unique cabinet was made at the renowned Royal Porcelain Manufactory at Sèvres, France.

Archives of American Art
(1285 Avenue of the Americas, New York)
The "Aura of Human Experience," Jacob Kainen from the Archives of American Art (through October 1) Show examines the Washington artist's multifaceted career.

Exhibition catalogs

Catalogs available currently include:
Reflections of the Weaver's World ($24.95 paper)
Face of the Spirits: Masks from the Zaire Basin ($49.95 cloth)
Felix Gonzales-Torres ($29.95 paper)
American Encounters ($8.95 paper)
Legend, Memory and the Great War in the Air ($34.95/$18.95 paper)
To order, send check or money order to Smithsonian Museum Shops, 8308 Cinder Bed Road, Newington, Virginia 22122. Include 15 percent of purchase to cover postage, handling (minimum, $1.75).

Office of Elementary and Secondary Education

The Office of Elementary and Secondary Education (OESE) offers a variety of programs, publications and services for teachers of prekindergarten through grade 12 nationwide. The recently published curriculum enrichment guide *Collecting Their Thoughts: Using Museums as Resources for Student Writing* is now available. Designed for grades 7-12, the kit stresses the use of primary source materials. Copies are $5 each. To order, write: OESE, Smithsonian Institution, Arts & Industries Building, Room 1163, MRC 402, Washington, D.C. 20560.

Smithsonian on the air

Smithsonian Chamber Music Performances by the Smithsonian Chamber Music Society and concerts from the Freer Gallery of Art are featured on National Public Radio's *Performance Today.*
Smithsonian Presents Invention Series of half-hour television programs explores the spirit of innovation behind invention. Tuesdays at 9 P.M., ET, on the Discovery Channel. Check local listings.
Dialogue Weekly public radio series on national and international affairs, history and culture features conversations with scholars, authors and political figures. Check local listings.

Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call (202) 357-3030, Monday - Friday—TTY: (202) 633-9467. The September events include:
Music Talks: Conversation with Ned Rorem (September 12; 6 P.M.) The Pulitzer Prize-winning composer discusses his recent memoir, *Knowing When to Stop.*
String Trio of New York (September 24; 7:30 P.M.) Performance of acoustic improvisations and compositions for violin, guitar and bass.
Closing Time: A Dialog with Joseph Heller (September 28; 6 P.M.) Interview with the renowned writer focuses on his life and his sequel to *Catch 22.*

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some September exhibits:
• District of Columbia (September 30 - November 6) *Mexico: A Landscape Revisited,* Mexican Cultural Institute.
• Flushing, New York (September 17 - January 8, 1995) *Louis Armstrong: A Cultural Legacy,* Queens Museum of Art.
• Gatesville, Texas (September 24 - October 23) *Seeds of Change,* Coryell County Museum.
• San Diego, California (September 17 - November 13) *The Good, the Bad, and the Cuddly: Attitudes Toward Animals,* San Diego Natural History Museum.

The work of Puerto Rican painter and printmaker Dennis Mario Rivera opens at Anacostia Museum September 18. Above, *Afro* (1989); left, *Flores para Francisco.*

There are times when he can go hours without saying a word. And yet, she still knows exactly what he's thinking. It's something you have to experience to truly understand. If you have, no explanation is necessary. If you haven't, no explanation is possible.

At John Nuveen and Company, where our tax-free municipal bonds have helped people live their dreams for nearly one hundred years, we still believe our strongest bond is human. Ask your investment adviser to show you the many ways a Nuveen investment may help you achieve long-term financial freedom. Or call 1-800-879-0207 to receive our free brochure on the rewards of tax-free investing.

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For more complete information on Nuveen tax-free mutual funds and unit trusts, including charges and expenses, send for a prospectus. Read it carefully before you invest or send money. Income may be subject to state and local taxes, as well as to the alternative minimum tax. Capital gains, if any, will be subject to capital gains taxes. ©John Nuveen & Co. Incorporated 1994.

"I'm going to the bathroom more than ever. I wonder what's wrong with me."

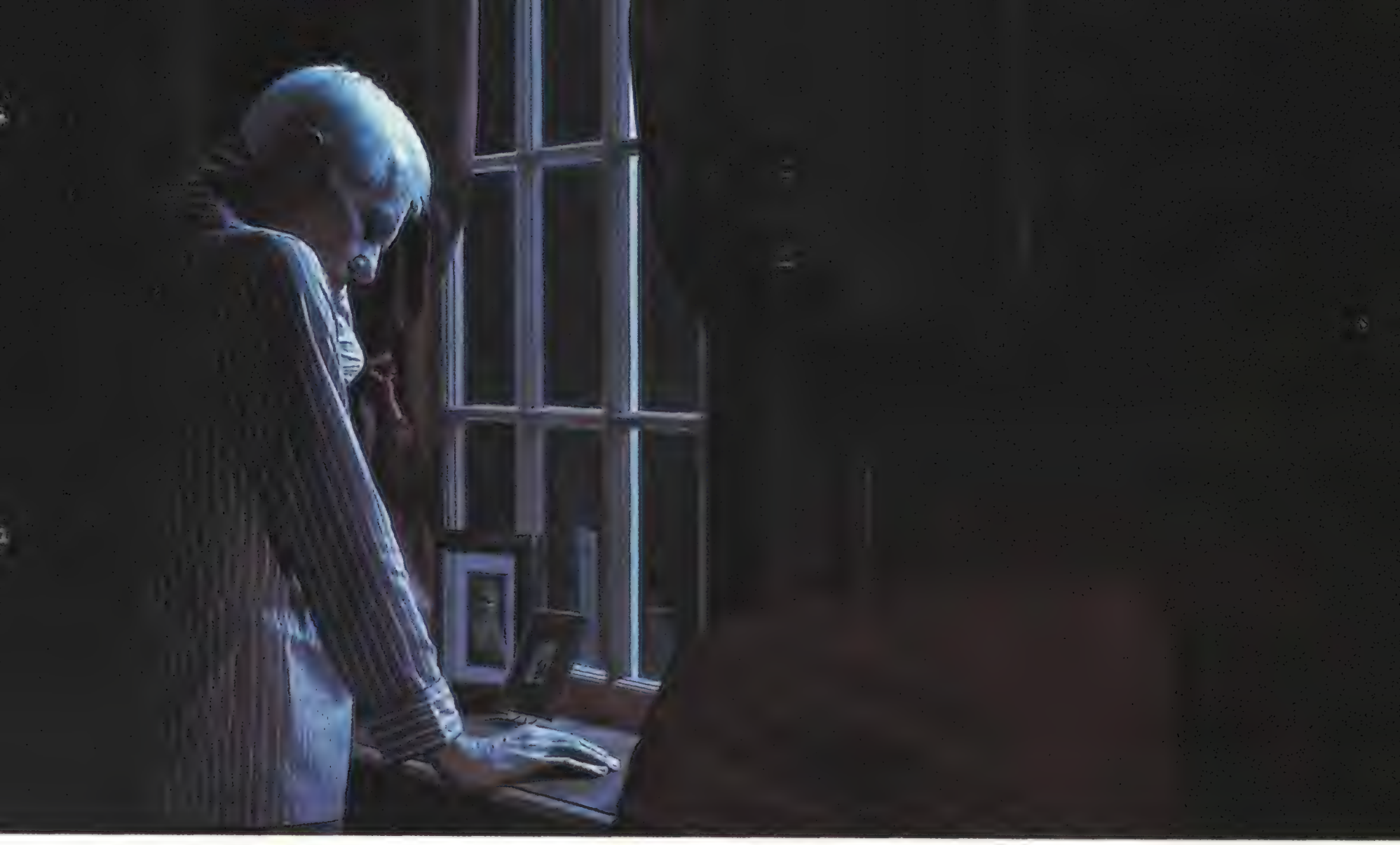
Your urinary symptoms may be caused by a condition called benign prostate enlargement or BPH.

Is this you?	Yes	No
Do you get up more than once or twice a night to urinate?	☐	☐
Do you often have sudden, uncontrollable urges to urinate?	☐	☐
Do you have a hesitant or slow urine stream?	☐	☐
Do you have a frequent need to urinate?	☐	☐

If you answered yes to even one question, tell your doctor.

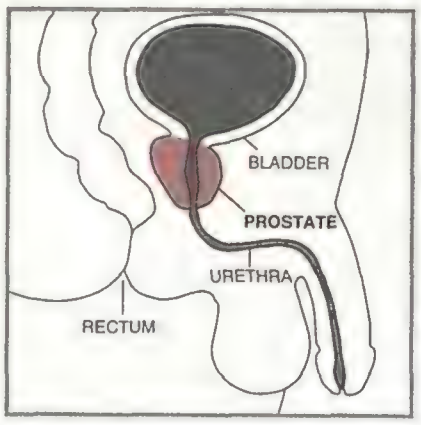
BPH is not cancer and does not lead to cancer, although the two conditions can exist at the same time. Remember, only a doctor can evaluate your symptoms and their possible causes.

Today, symptomatic BPH can be treated by your doctor in several ways. The options are monitoring the condition with regular checkups, surgery, or oral medicines. One oral medicine is PROSCAR® (Finasteride), the only prescription medicine for the treatment of symptomatic BPH that can shrink the prostate.



PROSCAR works by blocking a hormone that can cause the prostate to enlarge. *But it is important to know: PROSCAR doesn't work for everyone. Although the prostate may shrink, there may not be an improvement in urinary symptoms. However, in clinical studies with PROSCAR, some men have seen an improvement in their urinary symptoms after 2 weeks. Others have found that PROSCAR took up to several months to help them.* Because all men are different, you and your doctor will need to determine how PROSCAR is working for you.

If you have any urinary symptoms, see your family doctor or a urologist soon, and ask about PROSCAR. For free information to help you discuss your symptoms with your doctor, call 1-800-579-3745.



The prostate surrounds part of the urethra, the tube that carries urine from the bladder. As the prostate enlarges, it can squeeze the urethra and cause urinary problems.

For the treatment of symptomatic BPH

PROSCAR® 5mg
(FINASTERIDE)

The only medicine that can shrink the prostate.

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Please see patient information on the next page.

J4PO44(302)V3-MKP4045-3745

PATIENT INFORMATION ABOUT
PROSCAR® (Prahs-car)
Generic name: finasteride (fin-AS-tur-eyed)

PROSCAR is for the treatment of symptomatic benign prostatic hyperplasia and for use by men only.

Your doctor may prescribe PROSCAR if you have a medical condition called benign prostatic hyperplasia or BPH. This occurs only in men.

Please read this information, as well as the leaflet which accompanies your medication, before you start taking PROSCAR. Also, read the leaflet each time you renew your prescription, just in case anything has changed. Remember, this leaflet does not take the place of careful discussions with your doctor. You and your doctor should discuss PROSCAR when you start taking your medication and at regular checkups.

What is BPH?
BPH is an enlargement of the prostate gland. After age 50, most men develop enlarged prostates. The prostate is located below the bladder. As the prostate enlarges, it may slowly restrict the flow of urine. This can lead to symptoms such as:

- a weak or interrupted urinary stream
- a feeling that you cannot empty your bladder completely
- a feeling of delay or hesitation when you start to urinate
- a need to urinate often, especially at night
- a feeling that you must urinate right away.

Treatment options for BPH
There are three main treatment options for BPH:

- **Program of monitoring or "Watchful Waiting".** If a man has an enlarged prostate gland and no symptoms or if his symptoms do not bother him, he and his doctor may decide on a program of monitoring which would include regular checkups, instead of medication or surgery.
- **Medication.** Your doctor may prescribe PROSCAR for BPH. See **"What PROSCAR does"** below.
- **Surgery.** Some patients may need surgery. Your doctor can describe several different surgical procedures for BPH. Which procedure is best depends on your symptoms and medical condition.

What PROSCAR does
PROSCAR lowers levels of a key hormone called DHT (dihydrotestosterone), which is a major cause of prostate growth. Lowering DHT leads to shrinkage of the enlarged prostate gland in most men. This can lead to gradual improvement in urine flow and symptoms over the next several months. However, since each case of BPH is different, you should know that:

- Even though the prostate shrinks, you may NOT see an improvement in urine flow or symptoms.
- You may need to take PROSCAR for six (6) months or more to see whether it helps you.
- Even though you take PROSCAR and it may help you, it is not known whether PROSCAR reduces the need for surgery.

What you need to know while taking PROSCAR
- **You must see your doctor regularly.** While taking PROSCAR, you must have regular checkups. Follow your doctor's advice about when to have these checkups.
- **About side effects.** Like all prescription drugs, PROSCAR may cause side effects. Side effects due to PROSCAR may include impotence (or inability to have an erection) and less desire for sex. Each of these side effects occurred in less than 4% of patients in clinical studies. In some cases side effects went away while the patient continued to take PROSCAR.

  Some men taking PROSCAR may have a decrease in the amount of semen released during sex. This decrease does not appear to interfere with normal sexual function. Rarely, some men have reported breast swelling and/or tenderness or allergic reactions such as lip swelling and rash.

You should discuss side effects with your doctor before taking PROSCAR® (Finasteride) and anytime you think you are having a side effect.

- **Checking for prostate cancer.** Your doctor has prescribed PROSCAR for symptomatic BPH and not for cancer—but a man can have BPH and prostate cancer at the same time. Doctors usually recommend that men be checked for prostate cancer once a year when they turn 50 (or 40 if a family member has had prostate cancer). These checks should continue while you take PROSCAR. PROSCAR is not a treatment for prostate cancer.
- **About prostate specific antigen (PSA).** Your doctor may have done a blood test called PSA. PROSCAR can alter PSA values. For more information, talk to your doctor.
- **A warning about PROSCAR and pregnancy.**

  PROSCAR is for use by MEN only.

  PROSCAR is generally well tolerated in men. However, women who are pregnant, or women who could become pregnant, should avoid the active ingredient in PROSCAR.

  If the active ingredient is absorbed by a woman who is pregnant with a male baby, it may cause the male baby to be born with abnormalities of the sex organs. Therefore, any woman who is pregnant or who could become pregnant must not come into direct contact with the active ingredient in PROSCAR.

Two of the ways in which a woman might absorb the active ingredient in PROSCAR are:

Sexual contact. Your semen may contain a small amount of the active ingredient of the drug. If your partner is pregnant, or if you and your partner decide to have a baby, you must stop taking PROSCAR and talk to your doctor. If your partner could become pregnant, proper use of a condom can reduce the risk of exposing her to your semen (discuss this further with your doctor).

Handling broken tablets. Women who are pregnant or who could become pregnant must <u>not handle broken</u> tablets of PROSCAR.

PROSCAR tablets are coated to prevent contact with the active ingredient during normal handling. If this coating is broken, the tablets should not be handled by women who are pregnant or who could become pregnant.

If a woman who is pregnant comes into contact with the active ingredient in PROSCAR, a doctor should be consulted. Remember, these warnings apply only if the woman exposed to PROSCAR is pregnant or could become pregnant.

How to take PROSCAR
Follow your doctor's advice about how to take PROSCAR. You must take it every day. You may take it with or between meals. To avoid forgetting to take PROSCAR, it may be helpful to take it the same time every day.

Do not share PROSCAR with anyone else; it was prescribed only for you.

Keep PROSCAR and all medicines out of the reach of children.

FOR MORE INFORMATION ABOUT 'PROSCAR' AND BPH, TALK WITH YOUR DOCTOR. IN ADDITION, TALK TO YOUR PHARMACIST OR OTHER HEALTH CARE PROVIDER.

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Highlights continued

Africa's eloquent language of beads

Beadwork is one of the most prominent and compelling art traditions in Africa. Since ancient times, African peoples have valued beads both for their beauty and for their intrinsic worth as currency. Adornment with beads and the use and display of bead-embellished objects speak—in a symbolic language—of rites of passage and concepts of gender and religion, of wealth and power, and of political and social standing.

From simple disks of ostrich eggshell, bone or clay, to elegant orbs of carnelian, coral or European glass, beads have played an important role in the personal lives of Africans and in the court life of African kingdoms. "Beaded Splendor," on view at the National Museum of African Art through October 9, presents an arresting selection of beaded objects—14 works of art from west, central, east and southern Africa. Showcasing the creativity of African artists, the exhibit documents how African peoples have incorporated beaded dress and regalia into their lives and how they wear or carry beaded accouterments to define themselves within their societies. From a boldly resplendent Yoruba crown to an intricately rendered Bamum fly whisk, from the subtle tones of a Ndebele bridal apron to the vivid colors of a Maasai necklace, these objects bear witness to a complex and dynamic art form.
Diane M. Bolz

Faces of ancestors, birds alluding to spirit world, grace Yoruba crown.

Geometric patterns on bridal apron echo shape of houses of the Ndebele.

European glass beads strung on wire form spiral, tripartite Maasai necklace.

Belt ornament is part of ceremonial costume of Kuba king or nobility.

Fly whisk used by Bamum king bears images representing his retainers.

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AND DUMB

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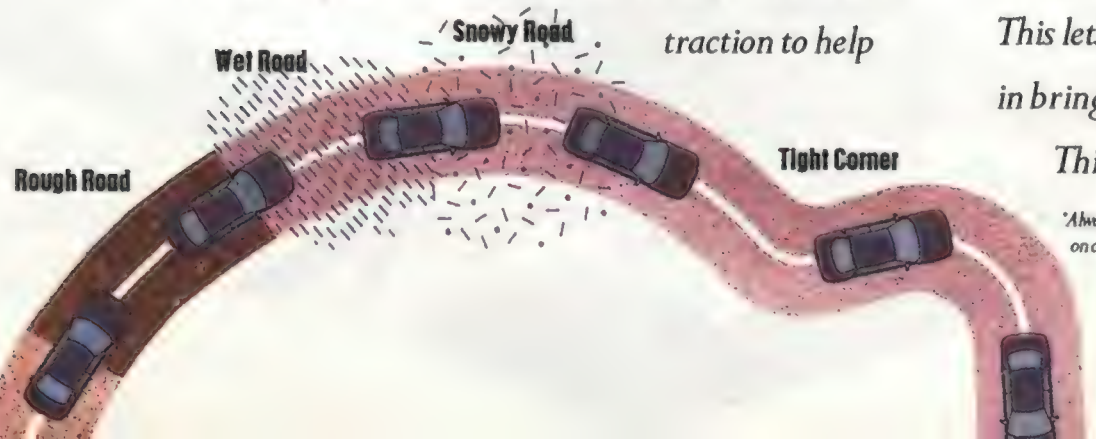

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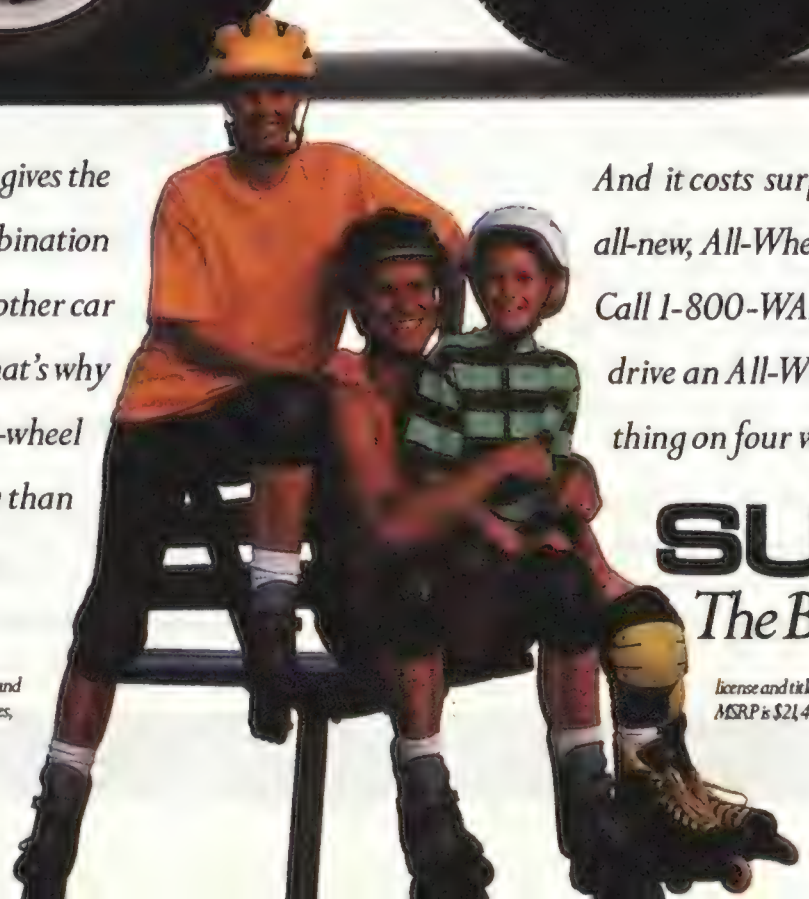

And it costs surprisingly little. In fact, you can get an all-new, All-Wheel Drive Legacy for as little as $15,999.†† Call 1-800-WANT-AWD or visit your dealer to test-drive an All-Wheel Drive Subaru. It's the smartest thing on four wheels.

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NEW **Tunisia** *March 19-30*

NEW **Jordan and Syria** *March 25-April 7*

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Venetian Art (Washington, D.C.) *March 4-8*

Wolf Tracking (Ely, Minnesota) *March 4-10*

Bonaire (Netherlands Antilles) *March 4-11*

Writers and Key West (Florida) *March 11-15*

Philadelphia Art & Architecture *March 18-22*

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It may not look like it, but this photograph was taken just last year, on Hurricane Creek Road.

THINGS MOVE SLOWLY in Jack Daniel's country. Occasionally, they stop altogether.

In Lynchburg, Tennessee, you can park in the middle of the road to talk with a neighbor about taxes or the weather. You can pick enough wild blackberries to fill a tin bucket. And you can see a distillery where Jack Daniel made whiskey way back in 1866. We still make it in a slow, deliberate fashion, much as he did. One sip, and you'll be glad to know we don't ever plan to stop.

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Placed in the National Register of Historic Places by the United States Government.

By Don Stap

Along a ridge in Florida, an ecological house built on sand

Once islands in a shallow sea, patches of scrub form a 'little Galápagos,' home to dozens of species found nowhere else

Writhing trunks and the fronds and flowers of saw palmettos dominate a low-level view of scrub.

This overgrown patch was burned a year earlier to open it up again for its many endemic species.

On a sunny March day John Fitzpatrick, director of the Archbold Biological Station in Lake Placid, Florida, takes me for a drive to show me a tract of Florida scrub, a peculiar ecosystem estimated to be two million years old. Pulling off the highway at the edge of a citrus grove near the station, Fitzpatrick plows up a slope of fine, white sand in his four-wheel-drive Bronco. Bouncing and twisting, we ascend a hill that rises 150 feet, about as great an uprise as one can find in Florida. At the top of the ridge, we get out and walk a few steps into a patchwork of stunted, gnarled vegetation that indeed looks ancient. The twisted trunks of saw palmettos, which have grown as much horizontally as vertically, appear wilted, barely able to rise off the ground; dwarf oaks, whose thick leaves have curled like dried leather under the Florida sun, are no more than five or six feet tall.

Though the oaks grow in formidable thickets, there are also open patches of bare sand and, in places, clumps of prickly pear cactus. Under the late winter sun, the dull, overlapping greens of the scrub resemble that confusing section of a jigsaw puzzle one leaves for last. The only outstanding features are the few scattered pine trees that dominate the landscape, their straight trunks rising branchless 40 feet or more before blossoming into evergreen crowns. The miniature forest beneath the pines looks as barren as living matter can appear.

When early travelers came upon an expanse of the inhospitable scrub, they saw a wasteland. One visitor wrote: "These tracts are, in fact, concealed deserts, as they are too poor to admit of cultivation, and afford nothing that is fit, even for the browsing of cattle." A later visitor observed that scrub "appears to desire to dis-

Photographs by Cameron Davidson

John Fitzpatrick, Archbold director, doubles as perch for a jay in a patch of typical central Florida scrub.

Stripping the scrub to plant an orange grove reveals the land for what it is: the top of a 200-foot sand dune.

play the result of the misery through which it has passed and is passing in its solution to life's grim riddle."

A grim riddle is, perhaps, how it appears to Fitzpatrick some days. Most Floridians still see scrub as nothing more than a repository for their old refrigerators, but a 1991 U.S. Fish and Wildlife Service report notes that "nowhere else in the United States, including Hawaii and Puerto Rico, do so many narrowly endangered plants occur so near to each other." An astounding 40 percent of the plants found in scrub are endemic to it. Of these, 17 are listed by the federal government as endangered, 4 as threatened, and one more is on the waiting list. Yet these dry uplands—the oldest ecosystem in the Southeast—have probably been disappearing faster than any other habitat in the United States. Approximately 85 percent of Florida's original scrub has been destroyed.

Only moments earlier, we had stopped on the side of the road and Fitzpatrick had pointed out my window to what he called "the Moonscape": 1,600 acres of sand. There, several years earlier, a citrus grower and developer had scraped bare what had been the largest, privately owned, untouched tract of scrub in the state. When Fitzpatrick first drove out to look at the damage, he found scrub jays, a species that lives only in scrub, perched on all that remained of their home: the bulldozed piles of uprooted trees. The jays had nowhere to

Citrus growers have moved south to escape frost and to take advantage of what is clearly well-drained soil.

go, and they would die slowly over the next few months.

Fitzpatrick, a highly regarded ornithologist and former chairman of zoology at the Field Museum of Natural History in Chicago, has been studying scrub jays for more than two decades. As a college student, he came to Archbold in the summer of 1972 to help University of South Florida professor Glen Woolfenden study the behavior of scrub jay fledglings. Over the years, Woolfenden and Fitzpatrick have documented traits that enable the jays to thrive in that unaccommodating habitat.

That anything lives in scrub is a testament to the efficacy of evolution. The conditions of Florida scrub are extreme, and paradoxical. Although Florida summers are hot and humid, dominated by intense afternoon thundershowers, and the annual rainfall averages 50 inches, scrub is a desert habitat: rain drains quickly through the fine sand as if through a sieve.

Indeed, the patch of scrub now before me looks like a bonsai garden gone to seed. In scrub, people become giants, their heads poking out above the treetops. "You have to get down on your hands and knees and look at it from a gopher tortoise's point of view," Fitzpatrick likes to say. Many plants grow only a few inches high, producing bouquets of flowers fit for a doll's house, and the only sign of many animals is a burrow entrance.

The inhabitants of scrub are often as peculiar as they are diminutive: the short-tailed snake has no known relatives and no fossil record; the scrub firefly flies in daylight; and the rare sand skink, a nearly legless lizard, seldom sees the light of day, preferring to spend its time beneath the sand, where it swims fish-fashion in pursuit of its prey—termites and beetle larvae.

Scrub is also home to many Florida animals whose numbers are diminishing throughout the state, including the Bachman's sparrow, Eastern indigo snake, blue-tailed mole skink, Florida black bear, fox squirrel and, occasionally, the state's rarest mammal, the Florida panther.

A scrub mint that repels insects

Little is known about the plants that grow in scrub, though one member of the mint family, the Lake Placid scrub mint, has been studied extensively by Cornell University biologist Thomas Eisner. An endangered species, the mint grows in no more than a dozen sites that cover a total of a few-hundred acres. Eisner, who, like everyone else, noticed its potent spearmint fragrance, found that the plant repels insects. He envisions a time when the scrub mint can be genetically grafted to commercial crops.

Many of the rarest scrub plants grow on the site where Fitzpatrick and I stand. "This," Fitzpatrick says, looking over the vegetation before us, "is one of the finest pieces of this type of scrub. Look, here's sandlace, and here's Ashe's savory." Both plants, in their winter dormancy, are spindly, withered specimens that could easily go unnoticed. Kneeling down, Fitzpatrick sees three more scrub plants: papery whitlow-wort, Highlands scrub St. John's wort and wedge-leaf button snakeroot.

Regardless of the rare plants here, the same citrus company, which owns this 200-acre site as well, had planned to bulldoze it shortly after it cleared the 1,600-acre tract to the north. When Fitzpatrick heard this, he got on the phone. "I called them and asked if they would consider selling this parcel to Archbold," he explains. "No, the answer came back—it was already charted for citrus. A bulldozer would be out to clear it in a week or two, they told me. At that point, I resorted to begging. Finally, they asked me which corner of the 200 acres would I most like to see preserved if they decided to save any of it. 'The northeast corner,' I told them. It was the highest point of the hill with the greatest diversity of rare plants."

A week later the bulldozers were out at work—"*on the northeast corner*!" Fitzpatrick exclaims. "I called them immediately. I lost my cool and really let loose. 'If that's the kind of image of your company that you want to present,' I told them, 'we can make sure everyone in Florida sees it.'" The bulldozers were called off.

Don Stap, whose A Parrot Without a Name *describes the search for new bird species in South America, teaches English at the University of Central Florida.*

Joyce Wilson

Florida panther, the state's most endangered mammal, sometimes enters scrub in its constant search for deer.

Endemic, nearly legless sand skink "swims" through the soil as it hunts termites, beetle larvae and other prey.

Francis Lepine

Several pairs of nonmigratory Florida sandhill cranes forage on the grounds of the Archbold Biological Station.

Now, Fitzpatrick stands up and spreads his arms wide. "People say, 'You want to save everything.' No, we don't, I tell them. We just want to save what's left—the crumbs of the pizza so one and all can smell them and imagine what the whole pie must have been like."

From the ridgetop, orange trees run in every direction as far as the horizon—roughly four million trees, worth at their maturity about $21 million in net profits annually. "*Nothing* lives in an orange grove," Fitzpatrick says, "except mockingbirds."

Much of Florida's citrus industry moved south to Highlands County, where Archbold and most of the remaining scrub is located, after several freezes in the 1970s and '80s destroyed many of the Orlando-area groves 100 miles to the north. Citrus growers prefer Highlands County not only because damaging freezes are highly unlikely but because the county is aptly named: it is *high land*, and orange trees grow best in well-drained soil like the fine "sugar sand" found in scrub.

Standing on top of a 200-foot dune

This sand is the key to the origin of scrub. Where Fitzpatrick and I stand it is more than 200 feet deep. We are, in fact, atop a sand dune formed millions of years ago when the Atlantic Ocean—now 60 miles to the east—would have been lapping the beach little more than a stone's throw from us.

The Florida peninsula is a recent addition to North America, appearing above water for the first time about 25 million years ago when sea levels worldwide fell dramatically. Since then, the seas have risen and fallen several times. During periods of high sea level, when the peninsula was only a few miles wide, wave action piled up sand dunes which, when the seas receded to their present level, formed a ridge that runs down the center of the peninsula.

When the water level was particularly high, the uppermost points on the Florida ridge became an archipelago—"a little version of the Galápagos Islands," as Fitzpatrick says—on which evolved species unique to their own isolated habitat. Today these sandy islands, like the one Fitzpatrick and I stand on, are surrounded by a sea of orange groves and housing developments.

A major section of this sandy spine, known as the Lake Wales Ridge, extends southward from an area just west of Orlando to the southern boundary of Highlands County. Roughly 100 miles long and 4 to 10 miles wide, this ridge holds a large portion of the extant scrub in the state. Archbold scientists have determined that of 600,000 original acres of scrub and related xeric habitat on the Lake Wales Ridge system, fewer than 10,000 acres of the unique scrub remain. Fitzpatrick has a map in his office of this remaining scrub—200 tiny islands inked in against a white background. The pattern looks

like someone has flicked the last bit of paint off a brush.

In the mid-1980s a number of biologists around the state began to take a special interest in scrub, realizing that at the rate it was being cleared, nothing would be left by the turn of the century. David Martin, a botanist with the U.S. Fish & Wildlife Service, began talking about a national wildlife refuge. In concert with Archbold and the Nature Conservancy, Martin put together a proposal that would protect 10,000 acres on 12 separate sites. The Lake Wales Ridge National Wildlife Refuge, the first such refuge designated primarily to preserve flora, will protect 26 plants, 4 vertebrates federally listed as threatened species and more than 40 species of rare endemic invertebrates. Florida's Conservation and Recreation Lands Program, perhaps the nation's most ambitious, is set to purchase the majority of the now-planned 20,000 acres, but the acquisition process is agonizingly slow, and although Congress approved the refuge in 1992, it has so far appropriated only $2 million.

For the time being, very little scrub is protected. Archbold owns about 5,000 acres, and the Nature Conservancy owns another 1,500. The same day that Fitzpatrick showed me the 200-acre "scrub island" owned by the large developer-citrus grower, he met with Nature Conservancy officials who had brought a prospective patron to Archbold to show her the kind of land her donation would protect. On such occasions, Fitzpatrick takes guests on what has become his routine VIP tour of scrub jay country. I went along.

Scrub jay goes right for the peanut

We drove a few hundred feet down a fire lane. On foot, we followed Fitzpatrick a short distance into the scrub, where he reached into his pocket and pulled out a peanut. He pursed his lips and made the "splish-splish-splish" sound used by bird-watchers everywhere to call in curious birds. In seconds a scrub jay came zooming in over the treetops and, rather than alighting on a nearby branch, brazenly landed on Fitzpatrick's outstretched arm to pick at the peanut he held tightly between his thumb and forefinger.

Reading the bird's leg bands, Fitzpatrick announced, "This is dash-silver-azure-yellow. He's the oldest living jay in this study site—14 years old." Before he had finished his sentence several more jays arrived, perching on any convenient shoulder, head or forearm. The top of a scrub jay's head, its wings and tail are azure blue, the underside an exceptionally fine silver-gray. A brown patch covers the upper back like a small cape. It was the bold glint in one particular jay's black eye that drew my attention, though—that and the strength of its grip on my arm.

The Florida scrub jay's well-developed legs—which have evolved, Fitzpatrick speculates, because it spends considerable time hopping around in open patches of

Wedge-leaf button snakeroot inhabits open gaps between shrubs but vanishes when scrub becomes too overgrown.

Thomas Eisner

John W. Fitzpatrick

Lake Placid scrub mint (left) is endangered, while pigeon-wing butterfly pea is only threatened—so far.

James N. Layne

Another endemic, Curtiss' milkweed, is a solitary species whose presence indicates scrub in Florida.

A carefully planned fire roars through a patch of badly overgrown scrub at the Archbold station. The entire ecosystem is dependent on periodic fire and quickly becomes a much poorer place without it.

sand where it stores acorns—is one trait that distinguishes it from western scrub jays. Most likely, western jays colonized the Southeast when the Gulf of Mexico was dry land. Ornithologists now agree that the Florida scrub jay is a distinct species.

When Glen Woolfenden began his study of the birds in 1969, he noticed that young jays remained with their parents to help defend the territory and even raise the fledglings the following year, a rare trait in the avian world. After Fitzpatrick joined him in 1972, the two researchers discovered a number of other traits that link the jays to scrub. The birds feed in the winter months primarily on acorns produced by the four endemic species of dwarf oak, each jay harvesting as many as 8,000 acorns a year. The jays need the open, sandy areas because they bury the acorns, returning to eat them later. They've also developed a communal system to handle the threat of aerial predators, one that works only in scrub where the treetops are low and relatively uniform. The jays post sentinels, which can sit at treetop level and see any hawk coming into the territory. Woolfenden and Fitzpatrick believe the young scrub jays remain with the family, waiting to inherit a territory, because scrub has always existed in isolated pockets. Consequently, the young jays have nowhere to go once a tract of scrub is filled to capacity, one family per 20 acres. Today, with much less habitat, Florida's scrub jay population is estimated at 4,000 breeding pairs, compared with the 15,000 or more pairs that inhabited the Lake Wales Ridge alone before the age of bulldozers.

A few weeks after my visit with Fitzpatrick, I returned to Archbold just in time to watch 28 acres of scrub go up in flames. A billowing plume of white smoke was rising into the sky as I drove up to the headquarters. Moments later I was escorted to the front line of the fire where I met Eric Menges, Archbold's resident plant ecologist, who was hastily eating a peanut butter and jelly sandwich. "We just started," he told me, pointing toward a strip of still-smoldering scrub.

For tens of thousands of years, flames have ravaged the state's dry uplands. The fires were frequent—Florida averages more ground strikes from lightning than any other place in North America—and, consequently, the scrub ecosystem evolved as a pyrogenic community:

plants and animals alike adapted to the recurring fires. Fire is now as essential to the long-term health of scrub as rainfall. To re-create what once was natural, each year Menges burns off patches of overgrown scrub.

Without frequent fires, the elfin woodland becomes so dense it chokes out virtually all undergrowth, leaving few of the grasses and herbaceous plants that gopher tortoises, white-tailed deer, the endangered Florida mouse and other scrub inhabitants depend on for food. In addition, the oaks of overgrown scrub stop producing enough acorns for scrub jays, and the spreading trees cover up the sandy patches where jays would cache them. In fact, the presence of the jays is a sure sign of healthy scrub. Their absence, as was the case in the scrub Menges was burning off, indicated a patch that was unnaturally overgrown.

In just four hours, 35,000 acres

On this day, Menges had selected a 28-acre tract of scrub that had not burned since the 1920s. Because overgrown scrub is dense, extremely dry and filled with branches the right size for kindling, it produces a spectacular fire. To manage a fire in scrub, one first burns narrow strips called "black lines" on three sides of the woodlands so that as sections of the tract are burned off, the wind will drive the fire into the black lines, where it will die out for lack of fuel. Theoretically.

If, however, a sudden breeze lifted embers across the black lines, the thermal currents might drop them anywhere. With this in mind, a crew stood ready to put out spot fires. Another person in an all-terrain vehicle patrolled the area, looking for trouble. If a spot fire threatened to get out of control, Archbold's own firetruck, vintage 1956, stood ready. Small spot fires were routine, but what Menges feared was a sudden shift in the wind that might start a major blaze. Scrub wildfires are virtually uncontrollable. In 1935 lightning started a fire in the scrub in Ocala National Forest. In only four hours, the wildfire raged through 35,000 acres.

For the next two hours Menges and his crew continued burning off small sections of the tract. Putting on a firefighter's flame-retardant coat, I went with Menges into the heart of the tract to get a closer look at one of the fires that two crew members were lighting. We squeezed through a thicket of dwarf oak.

"You can see how hard it is to get into the middle of scrub to set a fire to burn off even just a piece of it," Menges said. "Your adrenaline really gets going, and you're always looking around for an escape route. In dense scrub like this, it would be hard to outrun a fire."

As Menges spoke, we could hear the fire coming our way. A hundred feet ahead of us we could see plumes of black and white smoke rising swiftly, then mushrooming 200 feet into the air. Seventy-foot pine trees swayed and shook in the thermal updrafts. The fire climbed them in a matter of seconds, engulfing the crowns all at once. In an instant the cones of the sand pines glowed red, lighting up like Christmas-tree lights.

As the fire approached to within 30 feet, it felt like a hot iron pressed against my chest. We began to back up. The palmetto fronds before us crackled and sizzled, disintegrating from the heat even before the flames reached them. Menges gestured to a blackened area behind us. The roar of the fire, like a sheet of metal being whipped back and forth, made conversation nearly impossible. We stepped back into the safety of the burned-out scrub, then backed up farther. The 70-foot tidal wave of flame coming at us hit a wall of nothing and fell to the foot of the last oaks. A cactus contorted in the intense heat, slumping like a deflated balloon.

Later, looking at the remains of the fire, I found it hard to think of this as "habitat restoration." The trunks of the pines were scorched black, their bark reduced to charcoal. The dwarf oaks were leafless skeletons. All that remained of the palmettos were the clustered

Eric Menges checks damage to a slash pine scorched by fire three months earlier; palmetto is thriving.

The father rides calmly along as 11-day-old scrub jay chicks are taken from nest to be banded and weighed.

trunks, which looked like the contorted arms of a dying octopus. Everything was covered with black ash—the negative of a winter scene. I could not imagine a more desolate landscape.

Scrub plants, however, have evolved remarkable means to survive such fires. The cones of sand pines usually open only in response to the 400-degree heat of a fire; in the following days the seeds of a new generation of trees fill the air. Dwarf oaks maintain 75 percent of their biomass safely beneath the sand, and Florida rosemary releases a chemical into the soil around it, apparently to stop its own seeds from germinating. The seeds do not sprout until a fire kills off the parent plant.

At one point that day I had asked Menges about the animals that were caught in the fire. Raccoons and many other mammals, he told me, retreat into gopher tortoise burrows, which they share year-round with the tortoises. Some lizards will burrow quickly beneath the sand, while others scurry to keep ahead of the flames. A few birds may lose their nests when fires are set in the spring, but over all, the casualties are few. "You have to take the long view," Menges said, explaining that healthy scrub supports far more animals than overgrown scrub.

Almost exactly a year later, I visited Archbold once again. I was curious to see what the previous year's burn looked like. First, though, I spoke with John Fitzpatrick. What progress had been made on the Lake Wales Ridge National Wildlife Refuge? Had the state or federal government purchased any land during the past year? "No," he answered bluntly.

In fact, Fitzpatrick was unhappy. Although the Nature Conservancy hoped to buy the 200-acre ridgetop scrub island he had shown me on my first visit, and the wildlife refuge was now the number four priority on the state's land acquisition program, preservation efforts were moving very slowly. Worst of all, a 4,000-acre acquisition was falling through because the state had taken three years to map boundaries, appraise the land and then make an offer of $1,000 per acre, which Fitzpatrick called "ridiculously low." Outraged, he called the state and asked, "When was the last *decade* that someone paid that price for land of that kind around here?"

(Last month, Fitzpatrick reported that finally the state had purchased a 3,300-acre tract of particularly valuable scrub, and other acquisitions looked a bit more promising.)

"We have a chance here to save a whole ecosystem," Fitzpatrick said. "We're always asked why bother saving it, to which one can reply, 'Why save the *Mona Lisa*? It's old and doesn't produce anything for us either.'"

Beyond the moral imperative, Fitzpatrick argued that we should preserve these dry, scrawny woods for the same reason we say we must save tropical rain forests: self-interest. "Scrub is a gold mine of genetic information," Fitzpatrick points out. "These are plants that have spent a million years evolving ways to deal with a very specialized problem: hot, wet summers, cool, dry winters, poor soil—all things that humans have to deal with in agricultural systems all over the world. These plants may be holding secrets to how we can end up genetically engineering our agricultural systems to improve them, especially in dealing with a warmer planet."

Later that day I walked through the previous year's burn site with Eric Menges, who pointed out some of the new growth. Cutthroat grass now carpeted the area. The palmettos were once again green, and oak sprouts were growing profusely nearly everywhere we stepped. Several plants were flowering: slender blazing star, Edison's St. John's wort and tarflower. Scrub blueberry, which bears fruit only the first few years after a fire, was flourishing as well. We picked a few of the ripened berries, not much bigger than peppercorns and not much sweeter.

Animals, too, had moved back into the area. We scared up a pair of ground doves as we walked, and I could hear a towhee calling—then, somewhere in the distance, a great-crested flycatcher. I stopped a moment to watch two red-bellied woodpeckers circle a dead pine tree. In two more years, maybe three, the oaks would bear acorns again, and a family of scrub jays would move into the area, staking out a new territory amid the austere beauty of this timeworn forest.

A marked gopher tortoise, whose burrow may shelter a variety of other animals, makes its way down a fire lane.

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By Joe Sherman

Like the factories he designed, Albert Kahn lived to work

Function was foremost for the modest architect to Detroit's auto czars, but his clean lines and airy spaces had a beauty ahead of their time

Almost a century ago, a small constellation of "misguided cranks," as skeptics called them, started the American auto industry in Detroit. Toiling in scattered oily shops, the energized visionaries captured the imagination of a young architect named Albert Kahn. In 1903 "A.K.," as his colleagues called him, threw his future in with the car guys, becoming the architect for the Packard Motor Car Company. Already a major player in the fledgling auto business, Packard was moving from Ohio to Detroit to build the city's first factory specifically for manufacturing cars.

Kahn was taking a gamble. Not only because Packard built cars, still considered by many as toys for the rich, but because ambitious, turn-of-the-century architects didn't design factories. Engineers did. For nearly a century their factory of choice had been the modified New England textile mill—multistoried, framed with heavy timbers, floored with planks and, usually, covered with brick. Whether little or big, with or without ornamentation, such mills were "as stolid and conservative in character as the American industrialists who commissioned them," writes Kenneth Breisch in *Mills and Factories of New England.*

But things were about to change. Stodgy, conservative architecture was about to be leveraged into the hectic 20th century, with the factories of Albert Kahn playing a role as modernism's springboard. It didn't happen in 1903, though. The Packard plant, according to *Motor Age* magazine in 1904, was "one of the new style of factories that are gradually displacing the old prison work shops." But by architectural yardsticks, it was a mill, a big wood-framed one with better light than most. Then, in 1905, Kahn made a breakthrough.

The young automobile industry cried out for it. Enormously heavy car-making machinery vibrated timber frames. Oil and gasoline spills made fires a constant threat. Crammed assembly rooms, in which dozens of men pieced cars together one at a time, were dangerous and inefficient. Although Kahn was a traditionalist (his favorite architects were McKim, Mead & White, masters of the tides of revivalism washing over America from Europe), now that he'd veered from the architectural pack, he turned to his true master: pragmatism. "Where the problem is new," as he said later in his career, "a new solution must be found to fit."

In 1905 his solution for Packard's building No. 10 was reinforced concrete. It was a relatively new technology, promising but unpredictable. Collaborating with his brother Julius, an engineer who devised reliable scientific formulas to predict things like shear force and settling, Kahn used concrete for floors, columns and beams, dressing up the outside with brick. Incredibly strong, fireproof, cheap to erect, with extra glass for more light and air, and wider spans for more room, the building was a simple solution to complex problems. It became a tourist attraction and accelerated Kahn's career into high gear.

"Ninety percent business, 10 percent art"

From then until 1942, when he died, Albert Kahn was responsible for more than 2,000 factories. His clients included Henry Ford, the Fisher brothers, the Dodge brothers and Walter Chrysler, as well as the Soviet government (Kahn's firm designed 521 factories in the USSR during the Depression) and the American military (boats, bombers, tanks and munitions crucial to victory flowed from Kahn-designed plants during wartime). Along the way, Kahn also organized the prototypical modern architecture firm, with teams, management systems—and one driving visionary at the top. Though he was skeptical of art's role in his work ("Architecture is 90 percent business and 10 percent art," he said), his glass-and-steel buildings had a great impact on the modernism movement. At the same time, he designed classical masterpieces, such as the General Motors and Fisher buildings, commercial landmarks boasting of their owners' power while paying homage to the historical styles tycoons seemed to love even more than cigars. Today, however, like the mythical, flamboyant Detroit he

"It defies description," wrote Charles Sheeler of "the Rouge" after photographing the huge 2,000-acre site.

Kahn—here, still going strong at 71—was described by business colleagues as "buoyant," even "acrobatic."

helped create, Albert Kahn is only dimly remembered. After his name in the *Penguin Dictionary of Architecture*, the entry advises, "see CONCRETE."

Kahn's beginnings as an architect were modest. He was the oldest son in a family that immigrated to Detroit from Germany. His father, a rabbi, came in 1879; the rest of the family came a year later, when Albert was 11. In Detroit, his father peddled vegetables from a horse-drawn wagon; his mother managed, and eventually owned, a restaurant. At 12, Kahn abandoned his first love, the piano (in Germany he'd been a prodigy), and found a job as an apprentice in an architectural firm. There, he filed drawings, ground India ink and ran errands—all for no pay.

But Kahn didn't work out, partially because he smelled like a stable from currying his father's horses each morning. Complaining that "he lacks vision and initiative; he'll never amount to a hill of beans," the head draftsman fired him. His mother then arranged for him to get drawing lessons from a well-known local artist named Julius Melchers, who later recommended him to the prestigious firm of Mason and Rice. But there, the head draftsman soon detected a significant problem for an aspiring architect—color-blindness—and marched Kahn into George Mason's office. Mason, only a decade older than the embarrassed teenager, asked him to identify the colors in a rug. Kahn spotted reds, yellows, guessed right on green. "If I had guessed brown," he joked later, "I might be a butcher today."

Soon making $30 a month as a draftsman, Kahn had also found a mentor in Mason (who taught him table manners). His new boss noted, "I have never known anyone with such an enormous capacity for concentration and study," observing with pleasure that "every spare moment of the day . . . Albert would spend reading our collection of architectural books." In 1887 Mason gave him his first significant assignment: laying out the 660-foot veranda of the Grand Hotel on Mackinac Island.

The ideal traveling companion

In 1890 Kahn won a $500 traveling scholarship from *American Architect and Building News*, borrowed another $500 and sailed for Europe. In Florence he met Henry Bacon, who had squandered most of a larger scholarship. The pragmatic Kahn and the scholarly Bacon, who would later design the Lincoln Memorial (SMITHSONIAN, February 1977), hit it off. Deciding to team up—Kahn handling the money, Bacon setting the itinerary—"we strapped on our packs and walked out of Florence to the next town," Kahn recalled happily. "Together we traveled and he taught me."

They spent four carefree months vagabonding, sketching hillside towns, cathedrals, architectural details; this trip, Kahn later claimed, was his "real educa-

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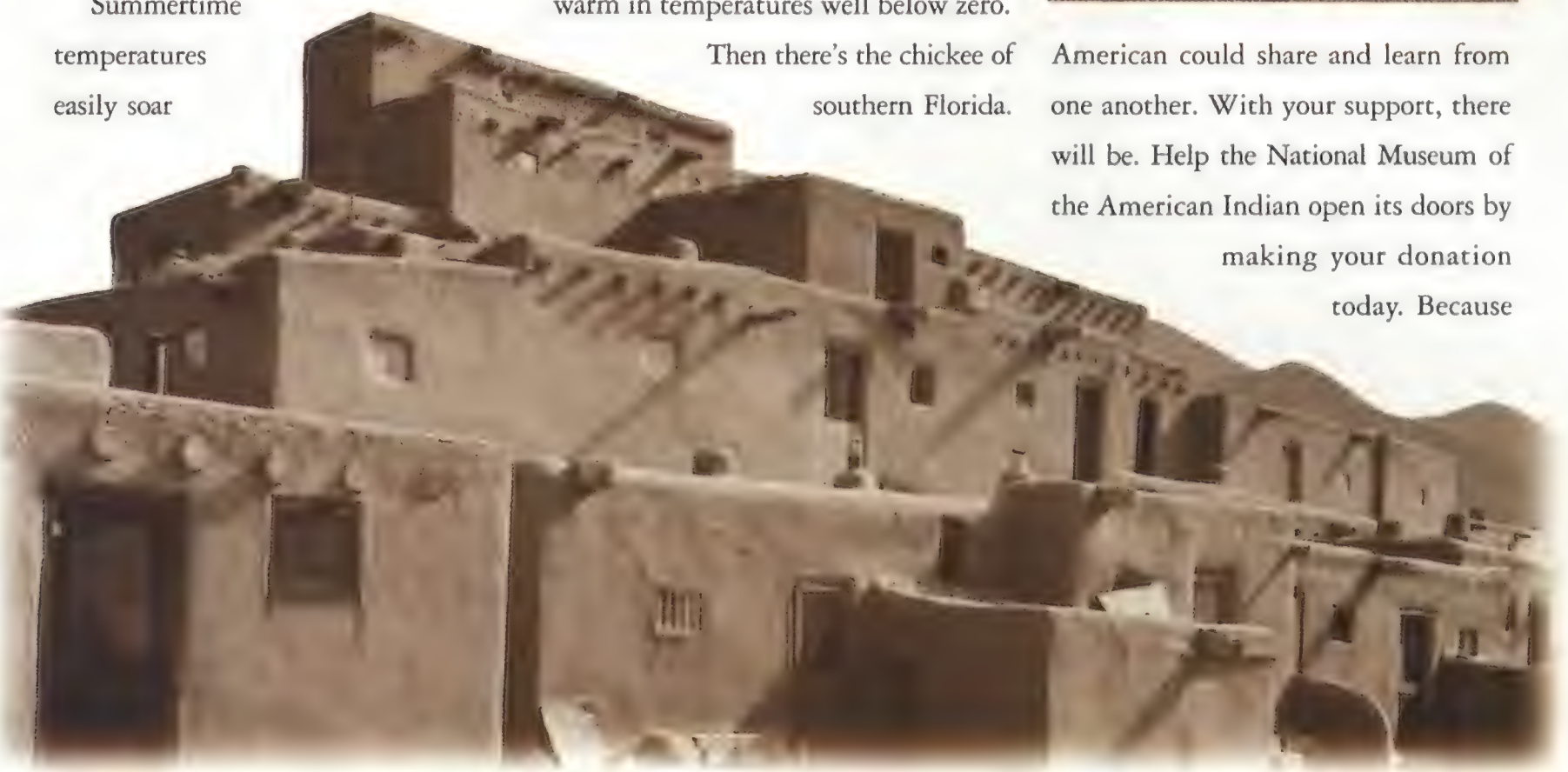

Mind you, this isn't an isolated example of American Indian ingenuity. Consider the igloo, a structure that's so easy to build, two Eskimos can put one together in minutes. And so energy efficient, all-you need is a small fire to stay warm in temperatures well below zero.

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Taking a break from designing auto plants for Henry Ford, Kahn planned Edsel Ford's residence in 1927. With none of the clean lines of his factories, it was inspired by the cottages in England's Cotswolds.

tion in architecture." He returned to Detroit with a more natural, fluid hand, talked with enthusiasm about Andrea Palladio, the great Italian architect of the Renaissance, and exhibited his sketches. Mason promoted him to chief designer.

Kahn married Ernestine Krolik, the daughter of a client, in 1896—the year that the first horseless carriage was driven in Detroit. Ernestine was an invaluable partner in his career, advising him on colors and interior design. A graduate of the University of Michigan, she also encouraged him to broaden himself by reading more. But Kahn, who had left Mason and Rice, had little time for that. Forging his reputation, he joined several partnerships. He designed the Children's Hospital for whisky baron and civic patron Hiram Walker; a small English-style library for *Detroit News* founder James Scripps; and a conservatory (and later, in the 1920s, a lighthouse) on nearby Belle Isle, Detroit's island retreat designed by Frederick Law Olmsted. The single curve ball in his straight career came in 1900, when he designed a pneumatic-hammer factory. This foray coincided with the emergence of new materials, including low-cost steel and reinforced concrete, and with new technologies.

Most of Kahn's contemporaries, however, preferred stone and granite in a revivalist style, not factories or the look of concrete and steel. There were exceptions. Emulating Louis Sullivan and the Chicago School, a few architects were tackling the tall building. In Oak Park, Illinois, Frank Lloyd Wright was merging the new technologies with nature in his poetic, residential Prairie style. Meanwhile, in Europe, where factories would eventually gain respect as a design frontier before they would in America, German wunderkinder Walter Gropius and Mies van der Rohe, whose names later became synonymous with the clean, spare, modern International Style, were still in their teens.

Kahn stumbled into industry almost by accident. The

Joe Sherman is the author of In the Rings of Saturn *(Oxford University Press), on the impact of the GM Saturn project in rural Tennessee.*

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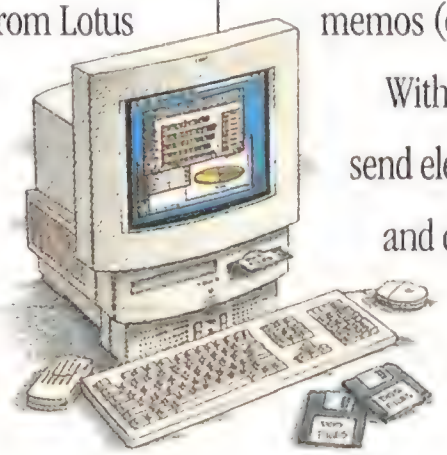

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Kahn was uncomfortable with the generous budget for the Fisher Building, a landmark of Detroit's skyline.

Angell Hall at University of Michigan: Kahn's bow to friend Henry Bacon, designer of Lincoln Memorial.

hammer-factory project had introduced him to Henry Joy, who, in 1903, became manager of Packard. Joy promptly offered Kahn the Packard job. Kahn had just founded his own firm, with Ernest Wilby as his head designer and his brother Julius as chief engineer. Henry Joy and other businessmen found that Kahn listened "to a remarkable degree," writes architect Grant Hildebrand in *Designing for Industry: The Architecture of Albert Kahn.* This quality enhanced "his ability to form and lead a genuine team [and heightened] his ability to respond sensitively to his clients' needs."

In 1903 Detroit was booming. Population had jumped from 116,000 in 1880 to around 300,000. The city's strategic location, skilled work force, cheap land, and entrepreneurs of things mechanical were about to coalesce into Motor City. Kahn was ready; short, stocky, with a bushy mustache and always in a suit and tie, he lived and breathed his work. He always carried a small jackknife in his pocket for sharpening pencils, deftly honing each to a point for sketching what his impatient clients often struggled to capture in words. Such drawings spoke more clearly than words, which was just as well because, Hildebrand says, "He was not very articulate." The *Detroit News Tribune* claimed Albert "saw the poetry in life, the embellishments and the beauties," whereas Julius "saw the structural backbone, the practical relations of concrete things."

In 1906 the brothers journeyed to Buffalo. In concert with Lockwood, Greene and Company, a Boston firm, they designed a car factory far ahead of its time. The George Pierce Plant was made up of eight, mostly single-story, roof-lighted, steel-and-glass structures ideal for continuous-flow production. That is, raw materials could be made into parts, and parts assembled into cars, all on one level. The layout's potential escaped Pierce, whose workers continued to make Pierce Great Arrows the old way: stationary, with excess motion, crowded assembly rooms and high costs. Assembly-line mass production wouldn't arrive for seven more years, when Henry Ford implemented it in a reinforced-concrete, multistoried behemoth that Kahn designed for him.

Kahn had his doubts about Ford

"Mr. Kahn, can you build factories?" Ford had asked him. "I can build anything," was Kahn's cocky reply the first time the two of them talked on the phone. But when Ford took Kahn to an old racetrack several miles north of the industrialized downtown, the architect had his doubts. Ford envisioned a massive factory on the site that would consolidate all Model T production operations under a single roof.

"I thought he was crazy," Kahn acknowledged later. "I didn't think it was possible, but I didn't want to tell him that. I wanted to see what could be done." He made

some rough drawings. "You've got only part of the idea," Ford told him. Kahn suggested centering the building on the 230 acres. No, said Ford; keep it near the street to allow room for expansion. Kahn began to grasp "the magnitude of his conception."

Four stories, with big windows running its 860-foot length, the "Crystal Palace," as the Highland Park plant was nicknamed, opened on New Year's Day 1910. It was advanced but not advanced enough to handle America's voracious appetite for the car. No single building, regardless of size, could do that. In 1904 the entire industry had made 22,000 cars; in 1914 Ford alone built 248,307 Model T's at the Highland Park plant, which was expanding continuously.

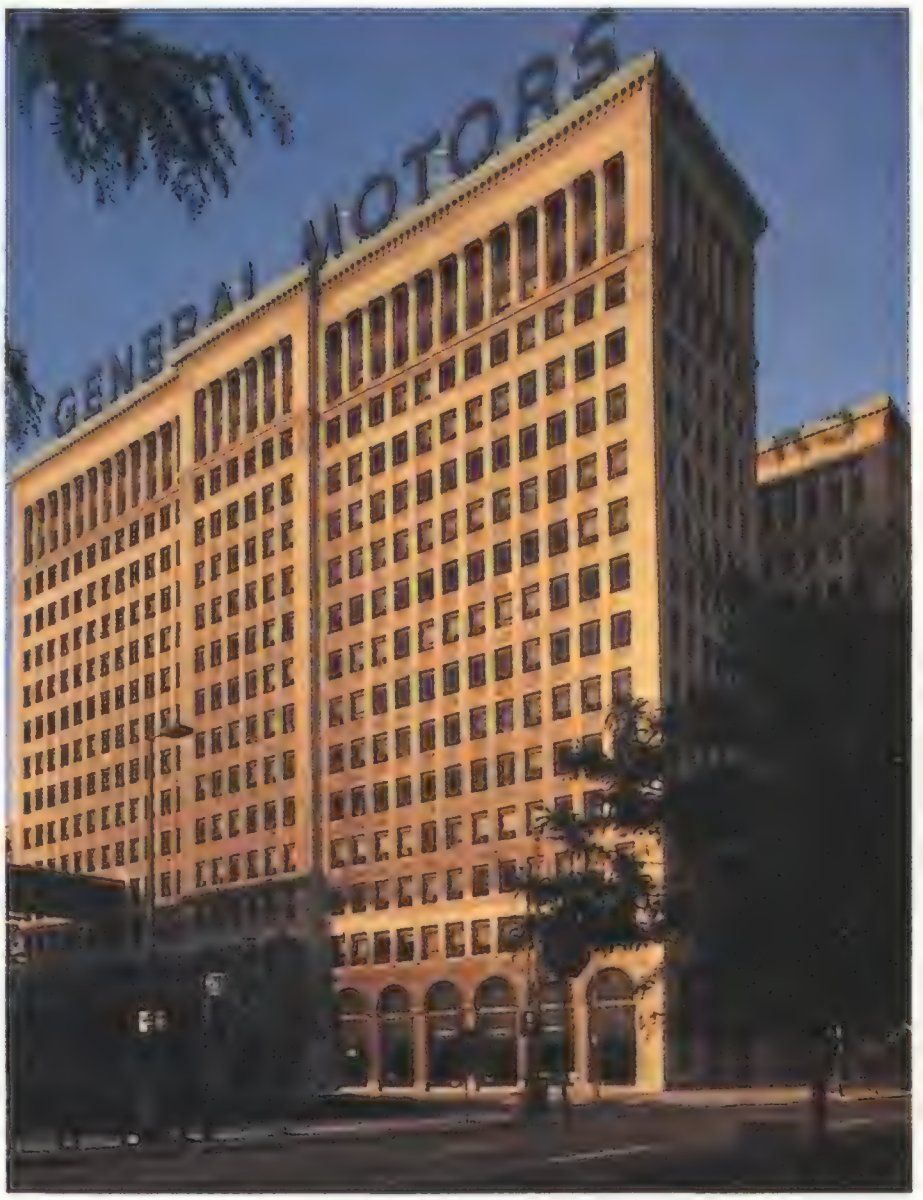
Major wrinkles in the assembly line

Kahn also did a power plant, an administration building and a machine shop, its roof a broad expanse of ventilating skylights (p. 59). In 1913 the automated assembly line, which Charlie Chaplin later parodied in the film *Modern Times* ("Don't stop for lunch!" "Be ahead of your competitors!") was introduced there. Yet the huge complex had expensive shortcomings. Most important, production didn't flow; it moved between floors and, in some stages, between buildings.

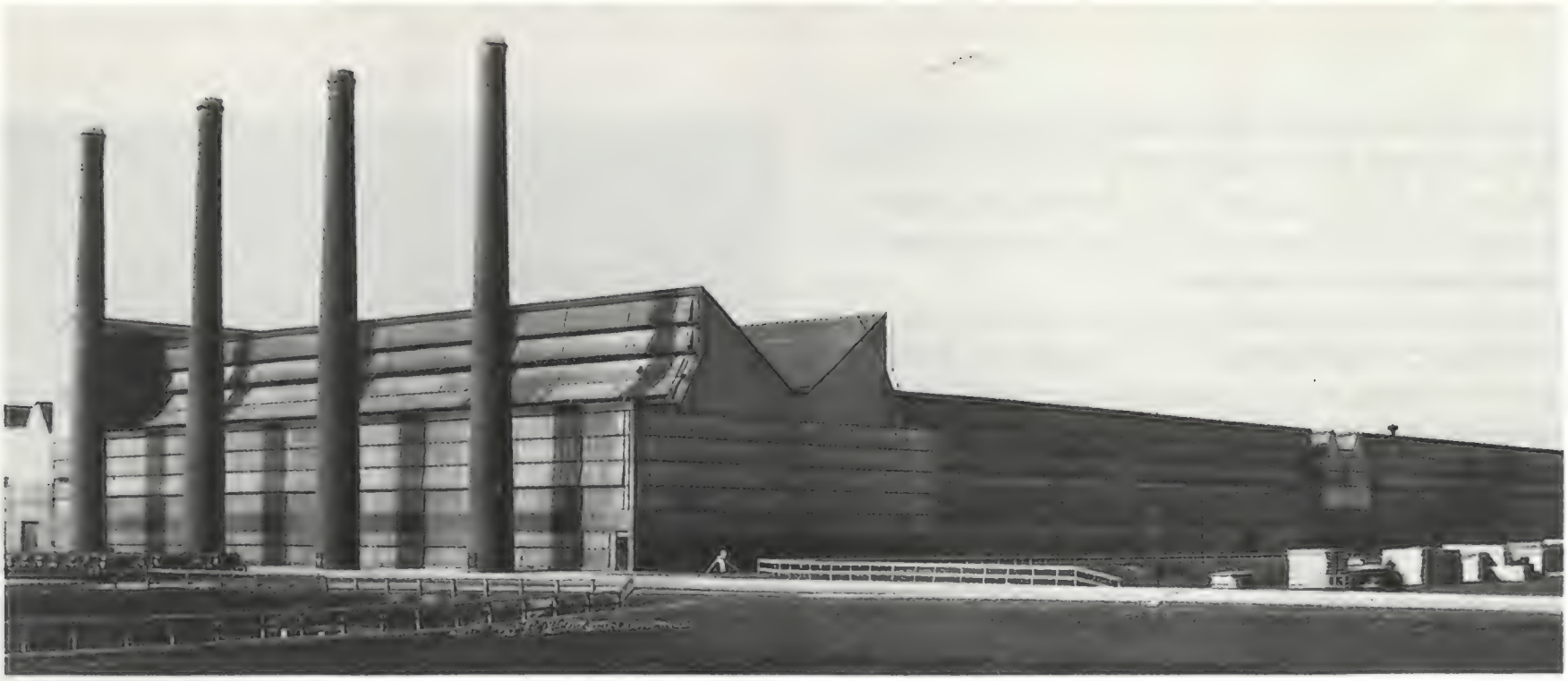
In 1917, with the Highland Park plant literally bursting its site (700,000 Model T's poured out of the place that year), Ford put Kahn to work on "the Rouge," a 2,000-acre site on the Rouge River in Dearborn, southwest of Detroit. Ford now knew that he wanted single-story buildings to house the processes involved in producing a Model T. He envisioned automated assembly lines flowing uninterrupted, all at one level, from raw materials to the finished car. Kahn's job was to provide functional enclosures for these processes that could be built quickly and at low cost.

Responding to Ford's vision, Kahn accomplished his most startling breakthrough. He designed the prototypical 20th-century factory, a monumental steel-framed, glass-skinned enclosure that solved all the classic needs for light, air, strength and big, open spans—all on one level, with offices and bathrooms hung from the steel frame, and with flexibility for future changes. "Eagle B," as the 1,700-foot-long structure was called, initially housed production of World War I submarine chasers, then later was converted to car assembly. In time the site included a 1,600-foot iron foundry, a powerhouse with eight smokestacks, each 333 feet high, and in 1922, a plant for manufacturing plate glass (p. 56). With a butterfly-shaped roof over four great furnaces that melted the raw materials, clerestory monitors and an ornament-free glass skin that gave it the look of some futuristic, esthetic machine, the glass plant "carried industrial architecture forward more than any other," Hildebrand writes.

Ford's operation quickly outgrew the 1910 "Crystal Palace," the first major plant Kahn designed for him.



A central spine with eight wings, rather than a tower, created open spaces for the General Motors Building.



The 1922 plate-glass plant at the Rouge exemplifies Albert Kahn's breakthrough in industrial architecture. As Ford requested, his design let in maximum light, allowed rising heat to escape, and was quick to build.

Meanwhile, Henry Ford was on an anti-Semitic tirade, publishing articles in his newspaper, the *Dearborn Independent*; so Kahn, who was Jewish, couldn't rest on his laurels. Afraid of being fired by his best client, the architect didn't criticize him. Their working relationship weathered the storm. Begun 15 years earlier, it was cemented by similar likes (both men were self-educated, pragmatic workaholics) and dislikes (for the college-educated, for subordinates who questioned their authority and for smokers, whom both loathed with a passion). Kahn confided to Ernestine (she was vacationing in Europe in 1923 while he, bogged down in work, stayed home), "Whether we can hold them [Ford] is of course always a question. We'll try our darnedest."

Through those years, the indefatigable Kahn worked on all architectural fronts at once. While his factories epitomized modernism before the movement even had a name, his other buildings, such as gemlike, arcaded Clements Library and sprawling, columned Angell Hall at the University of Michigan, Ann Arbor, were classically inspired. The General Motors Building in Detroit had 1,800 offices and a look of Gotham City invincibility.

In 1927, when artist Charles Sheeler came to "America's Mecca," as he dubbed the Rouge, factories were "in." Sheeler's photographs appeared in *Vanity Fair* and hung in art galleries. In Europe, the Bauhaus was preaching theories about "machines for living"— cubic, glassy structures with a manufactured look adopted from American industry—with promises to shelter the world.

Busier than ever, Kahn seemed blissfully unaware of the modernism movement. "I don't think he gave it much thought," Hildebrand says. Ironically, Kahn's oldest daughter, Lydia Winston Malbin, began collecting modern art in the late 1920s. Kahn disagreed with her tastes. He liked the Impressionists; works by Renoir and Monet hung in the family room of his Detroit home.

Even at 60, Kahn retained his youthful vitality. One observer described him as "acrobatic," moving "buoyantly" from meeting to meeting at the office. Relaxation was a Detroit Tigers game, a visit to the symphony with Ernestine, a movie. "Watching a Charlie Chaplin, Harold Lloyd or Laurel and Hardy film," his youngest daughter, Rosalie Butzel, remembers, "Father would laugh so heartily that Mother would become embarrassed." She came upon him at times listening to classical music on the record player, eyes closed, murmuring, "Beautiful, beautiful."

Summers were spent at "the Farm," 20 miles northwest of Detroit. A Kahn-designed hybrid, the house was built of reinforced concrete so it wouldn't burn, and sheathed in clapboards for a domestic look. On Sundays, the family (three girls, one boy) gathered there. Kahn's brothers visited. There were picnics in the beach house, a buffet at dusk and occasional cocktails. Finnish architect Eliel Saarinen, who taught at nearby Cranbrook Academy, and his wife sometimes visited.

Such informality did not carry over to the office. Systems adopted from the auto industry routed work, identified bottlenecks, controlled costs. His brother Louis, who "minded the store," as Albert was fond of saying, saw to that. Kahn tolerated no prima donnas, nor did he hire (until 1935) any design-hungry graduates of architecture schools, insisting they weren't team-oriented enough. Nepotism, though, was OK. Though he maintained a close association with the firm, Julius had left years before to start his Trussed Concrete Steel Company; Louis became second in command. A third brother, Moritz, headed an office in Moscow, established in 1929 after Soviet bureaucrats invited Kahn to oversee the design of factories for Stalin's first Five Year Plan.

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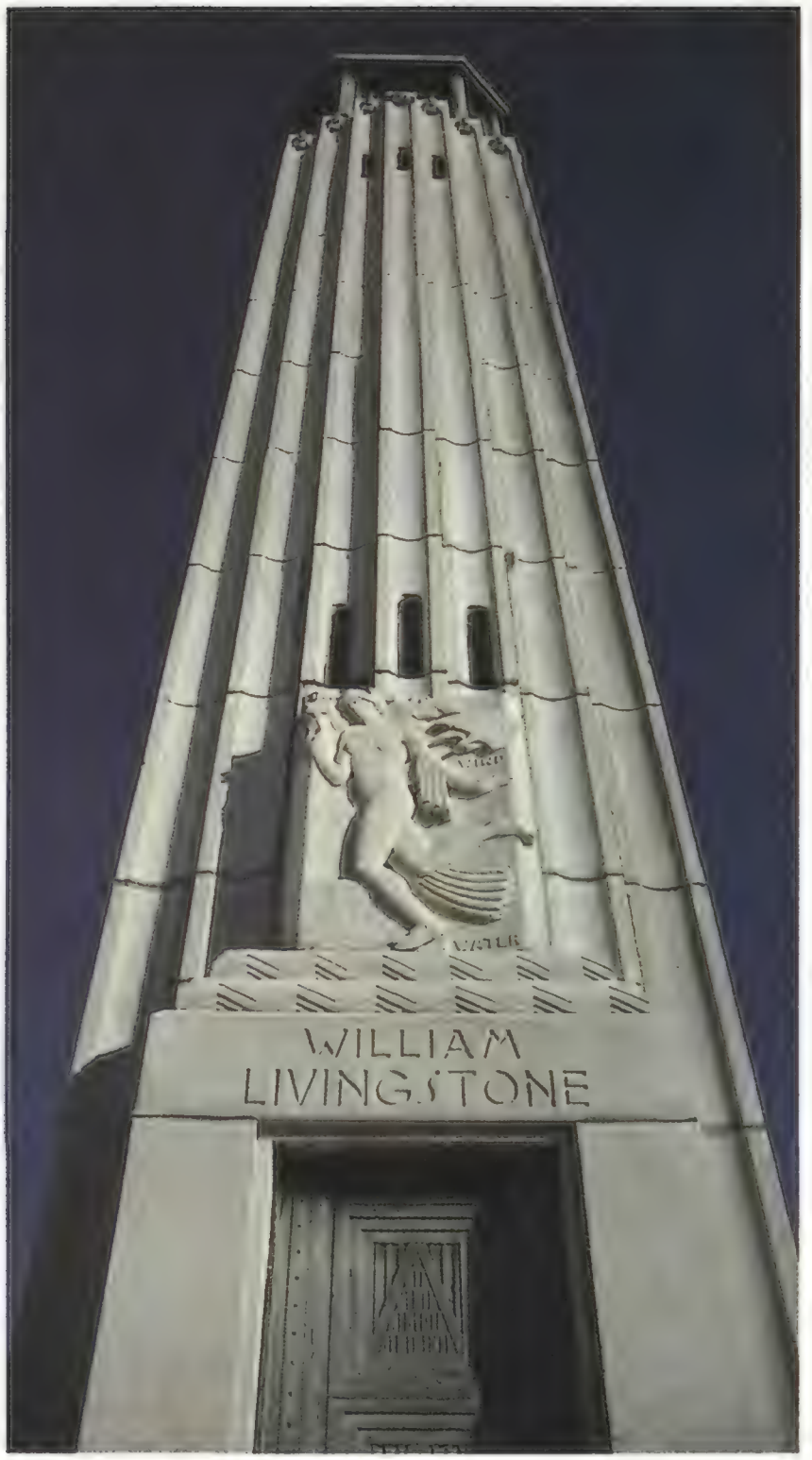


Kahn's lighthouse on Belle Isle (1929) memorializes Livingstone, who improved navigation on Great Lakes.

Sheldon Marston, an assistant superintendent for Kahn beginning in 1923, says, "Mr. Kahn was very good at putting responsibility on a person and forgetting about it until he expected the work done." Marston made the mistake of correcting Kahn only once. "I had a good bawling out," the 96-year-old Marston still remembers.

In the late 1920s Kahn outdid himself in smoothly shifting between projects. He continued work on the Rouge and designed a 60-room English-cottage-inspired mansion for Edsel Ford, as well as the Fisher Building, a 28-story "cathedral of commerce." Given carte blanche by the seven Fisher brothers, who had made a fortune on the enclosed car body, Kahn specified 41 shades of marble, a gold-ceilinged shopping arcade populated with eagles and nudes, and solid bronze trim for the exterior. Scientifically banked curves corkscrewed up the parking garage. Underground pedestrian tunnels glowed surrealistically, like invitations to wonderland. In 1928 the building was honored by the Architecture League of New York as the year's most beautiful commercial structure.

Now, 65 years later, although the 26th-floor dining room where the brothers ate lunch daily with their mother is gone, the Fisher Building remains in fine shape. So does the GM Building across the street. Few of Kahn's factories have been as lucky.

Saving old factories is tough

"Unfortunately, their number is diminishing," laments Charlie Hyde, a professor of history at Wayne State University and a Kahn enthusiast. "He did Dodge Main; it's gone. He did Chrysler's Jefferson Avenue plant; it's gone. There was a large Uniroyal plant; it's gone. Highland Park, what's left, is original." Saving old factories in Detroit is tough, Hyde concedes. They are neither draped in identifiable historical styles nor emblematic of corporate identity. An excellent location or an easily adaptable plant make reuse feasible. But "who in their right mind," says Hyde, "wants a badly deteriorated plant with three million square feet? It's unrealistic to think it could be marketed."

Highland Park, arguably Kahn's most famous plant, lies north of the city center, just off the once-grand but now seedy Woodward Avenue. "Many of the features of the plant are gone," said Lee Kollins, a retired Ford executive, during a recent visit to the site. "The smokestacks with 'FORD' on them were an early casualty." The Crystal Palace, the first building to go up, was demolished about 1960.

In the cavernous workshop of one of the remaining buildings, sparks flew as welders dismantled steel framing. The glass monitors in the roof, even though filthy, allowed sunlight to fall to the concrete floor. Several hundred feet away, a section of floor was being bashed into pieces, then loaded into trucks. While it wasn't clear what was going on, this sight seemed an apt symbol of the plight these factories face. Home of the Model T and birthplace of the assembly line, the Highland Park plant is a National Historic Landmark, but the designation carries little clout. Ford no longer owns the complex, Kollins said, and the present owners lease it out for storage.

The gradual deterioration "is troublesome," admits Kathryn Eckert, Michigan's State Historic Preservation Officer. "But planners and developers haven't found a new use for this complex. And until that happens, deterioration is going to continue." As Charlie Hyde puts it, "In Detroit, the typical attitude is it's just another car factory being torn down—yawn, yawn."

Not all of Kahn's industrial buildings are in trouble. A

few have been reused. Two reinforced-concrete manufacturing buildings he designed for the former Parke-Davis Pharmaceutical Company are now part of Detroit's River Place, a mixed-use project with 21 historic structures. Others continue in industrial use; the Rouge's Eagle plant still makes Mustangs, whose windshields come from the glass plant.

Presently, Kahn's reputation, always secure with architecture buffs, is on the ascent. A recent documentary by German filmmaker Dieter Marcello elevates him into the architectural pantheon, alongside Wright and Gropius. Marcello says the Bauhaus used photographs of Kahn's factories in the 1920s for reference and teaching. Where Kahn split with the modernists was over the design of the modern house. "He didn't believe people deserved to live in machines," says Marcello. In fact, the classicist in him believed that the Bauhaus style was "devoid of architectural feeling." Writing in *Pencil Points* in 1932, in a rare burst of pique, Kahn implored, "May Providence and our common sense save us from such aberrations!" By then it was the Depression, and even Kahn had slowed down. It was an era when industrialists were more likely to leap off buildings than to erect them. But Kahn rode it out, gaining a little weight and entertaining more artists, including Mexican muralist Diego Rivera, who painted a Socialist's version of the Rouge in the Detroit Institute of Art, and his wife, painter Frida Kahlo.

After the economy bounced back in the mid-'30s, almost all of Kahn's work was industrial. In 1938 the firm created a formidable 19 percent of America's architect-designed factories. With war imminent, Kahn's staff swelled to 600. Their projects were mostly military-related facilities, including Chrysler's Tank Arsenal (its "Grants . . . stopped Rommel at El Alamein," Winston Churchill said; "the Shermans defeated him"). Shortly after the first B-24 Liberator rolled off the assembly line in his Willow Run plant, Kahn, 73, had a heart attack. Ignoring his own infirmities, he insisted on working. A third heart attack killed him on December 8, 1942. "He really died with his boots on," his daughter Rosalie recalls. "He kept going all the time, all the way."

Skylighted roof of Ford's Highland Park machine shop (1910) covered immense open workspace made possible by steel-truss construction. Kahn built only for function, but modernists saw beauty in his work.

Racing to rescue barnyard beasts from sure oblivion

Whether championing mountain ponies or beleaguered sheep, conservationists take up the cause of vanishing domestic livestock breeds

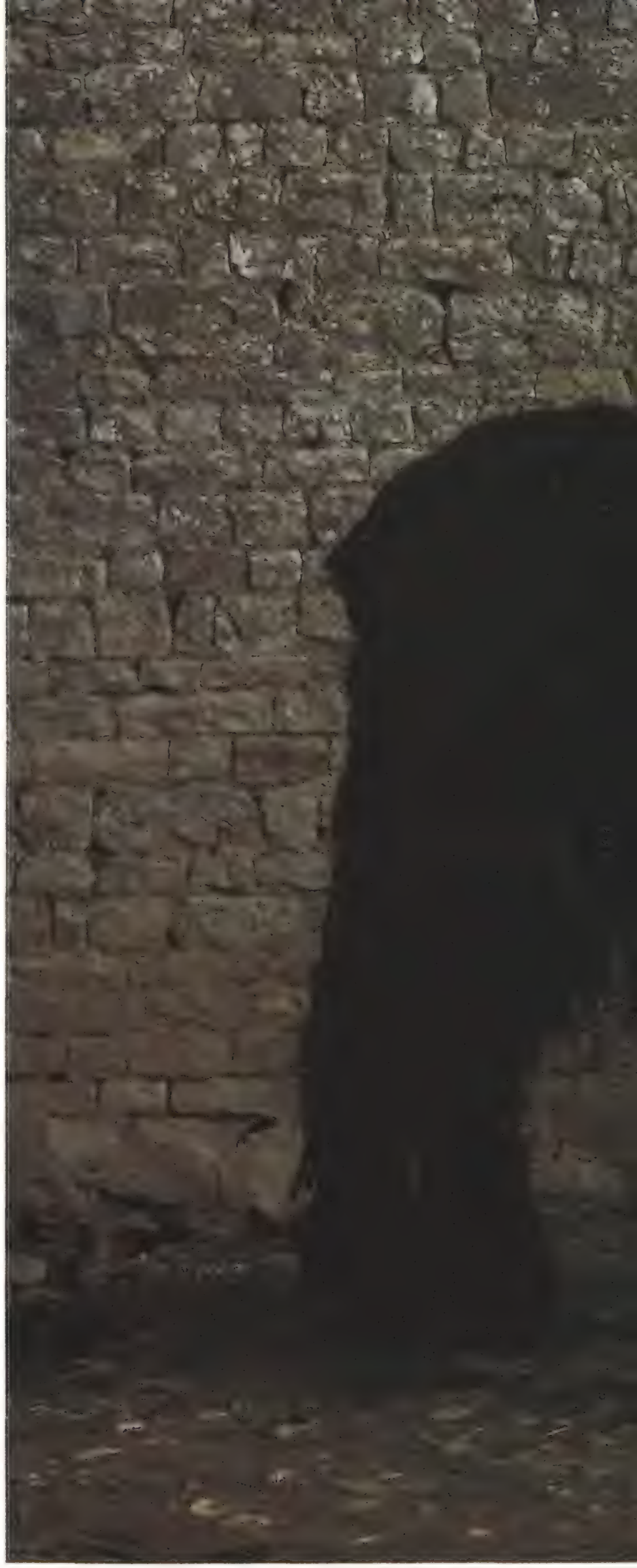
We have come to think of the African savanna and the Earth's dwindling rain forests—the habitat of rhino and elephant, chimpanzee and leopard—as the province of extinction. Yet we need look no farther than the barnyard or paddock to find creatures equally imperiled but living in our midst. Legions of domesticated animals across the globe—pigs and cattle, sheep and goats, poultry, horses and ponies—are gravely diminished in number or on the verge of vanishing altogether.

A number of these humble beasts, the ostensibly ordinary inhabitants of field and fold, are celebrated in *Rare Breeds*, an eloquent survey of threatened domestic animals to be published next month by Little, Brown ($29.95). Photographer Robert Dowling and writer Lawrence Alderson, who concentrated on chronicling Europe's beleaguered breeds, invested two and a half years in their documentation efforts. The team canvassed rural England, France, Germany and Hungary to produce this catalog.

As for the plight of these creatures, the figures speak for themselves. In Western Europe, 230 native breeds of cattle existed at the turn of the century: 70 of these had become extinct by 1988, and 53 were endangered.

Many of Earth's surviving livestock owe their existence to the dedicated efforts of such groups as Rare Breeds International, the global umbrella organization devoted to conservation of domesticated animals. Their mission has been to alert us to a fast-disappearing legacy: far more than curiosities, creatures such as Sicily's Girgentana goat and Britain's Dales pony are repositories of genetic diversity and, often, walking textbook studies in adaptation to a particular environment. They also represent a vital connection to our history and that of the animals living alongside us.

Kathleen Burke



Measuring nearly seven feet from head to hoof, oversize Baudet du Poitou, a breed of donkey found mainly in France, had become almost extinct during the 1980s.

Winning temperament and shaggy charm are hallmarks of the gigantic donkey, distinguished by its long, black or dark brown coat, floppy ears and pale face markings.

Now the focus of an urgent conservation campaign, the donkey is making a slow comeback: a total of 180 (including a small herd in America) are reported.

Photographs by Robert Dowling

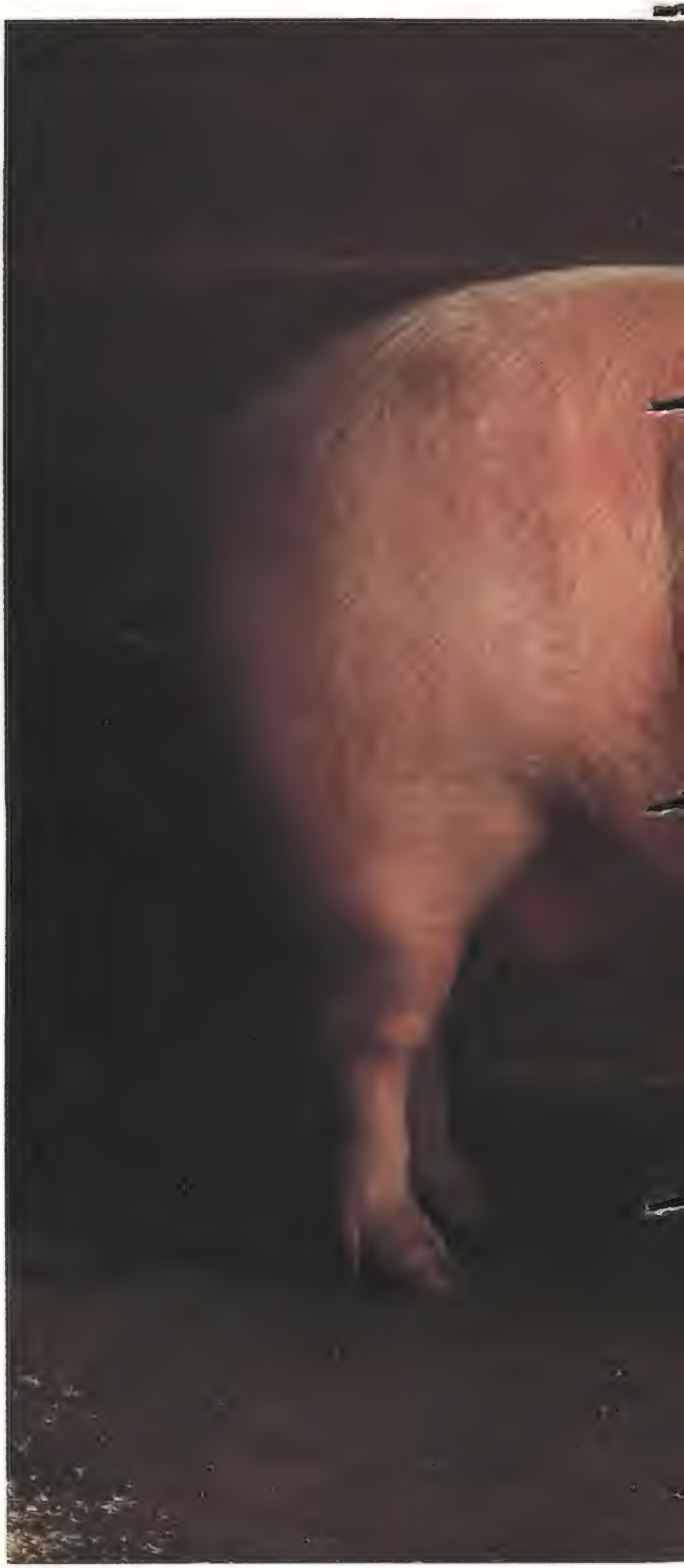
Native to Hungary, where large numbers of old livestock breeds are still to be found, the Blonde Mangalitza pig sports a singularly luxuriant coat. The endangered animal grows a hairy "fleece," marking it as a kind of porcine equivalent to a sheep; the Mangalitza is the only surviving breed of long-coated pig.

The Dales pony, one of the largest breeds of moorland and mountain pony in the British Isles, was bred by crossing heavy draft horses, likely Clydesdales, with Pennine upland ponies. Superb packhorses, the Dales once carried 440-pound loads of lead from mines in the hilly Midlands to the English coast.

Originally native to Sicily, the handsome Girgentana goat, characterized by its signature spiraled horns, has won admirers worldwide. The decline in the Girgentana's numbers can be attributed to the fact that the goat produces lower amounts of milk than the specialty breeds that have been hybridized for high yields.

Their existence even recorded by the Celts of pre-Christian Ireland, White Park cattle have gracefully curving horns and pure white faces with distinctive black markings on their muzzles, ears and eyelashes. This quite ancient breed—it is perhaps England's oldest—may have served as sacrificial cattle for the Druids.

The Jubilee variety of Indian Game fowl was created in 1886 and named the following year in honor of Queen Victoria's 50th anniversary on the throne. First developed in Devon and Cornwall from English and Indian poultry strains during the early 19th century, the breed is renowned for dense, plentiful breast meat.



One of the United Kingdom's most seriously endangered pig breeds, the Middle White was derived from crosses made in Yorkshire in the mid-1800s. The pig is descended from its wide-ranging Asiatic ancestor, *Sus scrofa vittatus*, the wild boar that is native to the thicketed reaches of Southeast Asian forest.

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By Ted Gup

Adventures (and misadventures) of Watson Fellows

They can go anywhere, and this little-known foundation will foot the bill. It may sound like gallivanting, but grueling is more like it

Michael McGuire / Courier Gazette

While other seniors at Pitzer College in Claremont, California, fretted about the job market, typed up résumés or flipped through catalogs for graduate school, Gail Horwitz had her eye on a bigger prize. She had stumbled across a fellowship program—"the Watson," it was called—that each year sends several dozen graduates anywhere in the world in pursuit of their dreams. Horwitz, a waifish figure all of five feet tall and 100 pounds, is an altruistic spirit who devoted her high school summers to digging latrines in remote villages of Ecuador and the Dominican Republic, and who later worked with Chicago's inner-city youth. She drafted a fellowship proposal outlining how she would work among leper colonies in Nepal and India, and examine the effects of isolation on the healthy children raised in those colonies.

About that same time, David Casagrande was busy at Wesleyan University, in Middletown, Connecticut, cobbling together his own proposal for a Watson fellowship. His interest was in developmental economics, but his passion was coffee. The grandson of a Brazilian coffee trader, Casagrande wanted to work on a Costa Rican plantation, then move on to Ecuador and finally to Papua New Guinea, studying the international coffee trade around the world.

Bobby Zirkin was a senior poli sci major at Johns Hopkins University. An incurable gym rat, he saw the Watson as a chance to pursue his one abiding love, basketball. His vision of the perfect year was to jet about between London, Brussels and Rome, trying to persuade Western Europe's colleges that what they really needed to do was organize the Continent's first international collegiate basketball league—the European Union's answer to the National Collegiate Athletic Association.

Heather Tarpley, a biology major at Davidson College, in Davidson, North Carolina, wanted to go into veterinary medicine—not to treat dogs and cats but wildlife. Her Watson fantasy was to disappear into the bush of Kenya, Madagascar and Australia for a year to study owls.

In the spring of 1993, these four dreamers received the long-awaited letters (postmarked "Providence," fittingly enough) granting their wishes. "I can't believe they're letting me get away with this!" marveled Tarpley as she packed her bags. "I feel almost guilty."

Unique among fellowships, the Thomas J. Watson Fellowship last year celebrated its 25th anniversary. Although it has dispensed some $17 million to 1,700 grateful college seniors, it remains little known. The Watson is content to go quietly about its business while the Rhodes, Guggenheim, Fulbright and MacArthur programs garner all of the attention. Unabashedly eccentric, it revels in taking risks as an expression of its faith in the young. Most prominent fellowships reward scholarship and stratospheric grade-point averages. The Watson recognizes creativity, resourcefulness and, above all, personal passion—the "fire in the belly," as foundation patron Tom Watson jr. put it. And, beyond quarterly updates and a final report, the foundation asks virtually nothing of its fellows in return. Here's the check, now be gone.

Watson Fellows have been dispatched to the very edges of the world in pursuit of everything from voodoo to vampires, tarot cards to tango, cake decorating to stand-up comedy. One blithe spirit spent a year traveling through Ecuador, Venezuela, Bolivia and Paraguay on a cross-cultural study of shoeshine boys. Several fellows have retraced the voyages of Charles Darwin. Another fellow had the chutzpah to go to Italy and redesign the French horn. This past year's adventurers, numbering 65, are chasing all manner of dreams, from studying the native ponies of the North Sea Islands to examining the role of drumming in Mali as a way of passing cultural heritage on to children.

I can't help but be a little envious. In 1972, I too was a Watson Fellow, about to embark on my own inspired if

Himself a Watson Fellow in 1972, the author (left) got his lost passport back thanks to Robert Crooks.

Thomas Watson jr., who started foundation, was happy to be alive after surviving a scare in his old biplane.

Photographs by Bruce Caines

Fred Fenton studied wildlife in South America in 1977 (above). Today, after a detour in law, he's pursuing a career in medicine.

somewhat harebrained scheme. Back then, as a senior at Brandeis University, I was devoted to two things—writing and manual labor. From summer jobs as a jackhammer operator, dress cutter and dishwasher, I had come to appreciate the satisfaction of working with my hands and the street wisdom of those with whom I labored. It was a welcome balance to the rarefied air of academia. As I was a classics major, my readings had been firmly anchored in 2,000-year-old literature and history. So my senior year, after spotting a notice on a campus bulletin board, I sent in my Watson application.

I imagined myself as an itinerant laborer and writer in Italy and Greece—the revered seats of antiquity—and in Ireland where, as a junior, I had studied at Trinity College. I proposed to follow the harvests of salmon in Ireland, grapes in Italy and olives in Greece, then chronicle my odyssey in poetry and prose.

My first attempt at a fellowship year was a bust, but it did have its moments. I recall standing in the rain on a road outside Dublin, my thumb outstretched, seeking a ride to virtually anywhere. A tiny Austin Mini stopped and took me in. The driver was a farmer from the west—Ballybunion, County Kerry—who was on his way home, having left his ailing mother in a Dublin hospital. He and his three brothers, he said, were in need of help—cleaning, cooking, farm chores. I jumped at the opportunity. A few hours later I was employed by the brothers O'Neil, living in a pup tent on the edge of a dizzying precipice that faced west toward America, and walking through dew-wet grass in rubber boots stuffed with hay to absorb the moisture.

As it turned out, I was not able to write much. My fingers were swollen and bandaged—nicked from unrolling bales of barbed wire—and by evening, I barely had the strength to blow out the lantern that hung by my tent. A few weeks later I told the O'Neils that I would be returning to America. I needed time to recover and get my bearings. It was a Sunday morning, and we packed ourselves into that tiny Mini, they on their way to mass, I on my way to Shannon Airport. When we came to the main road, one of the brothers pressed something into my hand as I was stepping out of the car—a wad of wrinkled bills. I tried to refuse it. They had so little money. For weeks I had seen no meat on the table, not even a rasher of bacon. Still, they insisted—and then sputtered off to church.

I returned to this country discouraged and disoriented. I telephoned the Watson's then director, Dan Arnaud. I apologized for bailing out after only a few months and offered to give back the money. Instead of chastising me, he invited me to Providence to spend the evening. That night, over a bottle of chianti and talk of Catullus (he had taught classics), I resolved that I would defer my Watson for a year and then try it again, which I did. The next time around I accomplished what I had set out to do. I worked, I wrote, and in the end I discovered how I would make a living.

Set up to honor the memory of the late Thomas J.

As a freelancer, Ted Gup has written for Sports Illustrated, GQ *and* Travel and Leisure. *Formerly he was a reporter for* Time *and the* Washington Post.

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Watson sr., IBM's visionary creator, the Watson Fellowship applies no financial criteria to candidates. They may be wealthy or poor. The modest amount—$15,000 for single fellows, $21,000 for those accompanied by a dependent, and all of it taxable—is intended to ward off opportunists seeking a cushy postgraduate tour. Situated on Angell Street—after moving from, honest now, Benefit Street—in Providence, Rhode Island, the Watson foundation is one of the leanest of charitable organizations: a former fellow serving as director, who sits for a two-year term, and an assistant director. The endowment's trust is more than $40 million.

Grant stipulations are few: don't return to the United States during the fellowship year and don't affiliate with organizations. The latter restriction is intended to preserve the freedom of fellows to follow up on serendipitous possibilities; it has the side benefit of forcing them to develop self-reliance. To be eligible, candidates must be seniors at one of 50 participating colleges and universities. The schools selected are among the top-ranking liberal arts institutions but small enough to know each student. The list includes Amherst, Bowdoin, Middlebury, Swarthmore, Oberlin and Rice.

Each year approximately 900 seniors apply. Colleges screen the candidates' proposals and conduct in-depth interviews. The nominees—some 180 in all—are then interviewed by the Watson foundation director or outside alumni interviewers.

The occupations of former fellows are as diverse as the projects they pursued. Count among these six farmers (three of whom note they are organic farmers), a candle designer, a commercial fisherman, a boat builder, "an entrepreneur and dream healer," a tutor to the royal family of Jordan, an opera singer, a mountain-climbers' guide, a designer of "virtual reality" equipment, and a smattering of priests, rectors and pastors. Fellows have made their presences felt in the arts, education, medicine and social work. They write for the *New York Times*, the *Washington Post*, *Time* magazine, *U.S. News & World Report*, *Newsweek*, *Rolling Stone*, the *Irish Times* and the *New Yorker*. Add to this motley collection a judge, a division chief of the World Bank, the president of Scripps College, a commissioner of the New York State Tax Tribunal and, oh yes, a guitarist for the B-52s.

To outsiders, it may sound like a boondoggle, but most fellows work long hours and endure profound bouts of loneliness, self-doubt and disorientation. I know I did. Many express a sense of guilt that they are

Retracing Darwin's voyage during his Watson year, Jim Affolter took a side trip in Peru's Andes. Currently he is research director at Georgia's Botanical Gardens.

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An ocean-liner buff, David Powers set sail for England on the *QE2* (above) at the start of his fellowship year. Combining vocation and avocation, he now works for Cunard.

not living up to the foundation's expectations, to which foundation directors respond reassuringly, "We have no expectations." Fellowship years are often punctuated by crises, some demanding midcourse corrections.

Even my second attempt was not calamity-free. I shall never forget the train ride I took from Venice on my way to London. I reached Milan easily enough, chatting with a British traveler who sat across from me. His name was Robert Crooks. Arriving in Milan, I thought that if the stopover was long enough, I would grab a bite at the station, then reboard. The conductor assured me there was time—at least that's what I could swear he said.

I got off the train, purchased an apple from a vendor and returned to track seven. But the train was gone—and with it my backpack, passport, manuscripts and clothes, and $5,000 in travelers checks. Worse yet, it was an express. Next stop, the English Channel. I had the equivalent of a quarter in my pocket, no identification and no train ticket.

I sought out the first person I saw in uniform, who assured me—at least I thought he did—that my train had been switched to track six and was just now pulling out. I hopped aboard, enjoying a moment's relief—until I realized it was not my train. I was bound for Germany.

Over the next two days and nights I jumped on and off innumerable trains, begged for food and hid in darkened lavatories, having unscrewed the light bulbs, until the conductor had made his rounds checking for tickets. Three days later I reached the Channel, utterly exhausted. There, waiting at the station, was Robert Crooks. He had gone through my pack, seen my ticket to London and decided to wait for me—with all my belongings intact. I have a photograph of the two of us standing together, with me gratefully displaying my lost-but-found passport (p. 69).

Such harrowing experiences are commonplace among Watson Fellows. Fred Fenton studied electric fish in South America. The first crisis came early: he was mistakenly arrested by the Venezuelan secret police, dragged from a restaurant, knocked down, thrown into a truck and strip-searched at gunpoint. He was released the next day without explanation. Later, while wading in a tributary of the Oronoco River, Fenton stepped on a freshwater stingray. It felt as if someone had shoved a nail into his foot. The wound festered, and Fenton became delirious. Eventually the injury caused him to cut his fellowship year short. Recently, after a detour as a lawyer, Fenton graduated from medical school.

Roy Hodges, a 1987 fellow and graduate of Johns Hopkins, was arrested and jailed after he was involved in a car accident in the United Arab Emirate of Sharjah. His cell was so small that only half of the 30 inmates assigned to it could lie down at any one time. No one else spoke English. Within hours, Hodges had been befriended by several inmates, who shared their yogurt with him. He, in turn, taught them to sing "American Pie." Hodges was released the next day after paying a fine. "Spending that night with those guys gave me a real insight into human nature," he says. "My whole Watson was like that." Hodges' project

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In 1987 Roy Hodges took a swim with a trio of Arab boys (above). Currently he works as a building consultant for a Saudi ministry.

was a study of the impact of technology on desert communities. His current job has him working with a Saudi Arabian ministry on the environmentally sound construction of a new building.

Many Watson projects lead to careers. At the age of 8, David L. Powers sailed from England to the United States with his family aboard an ocean liner, the *Empress of Canada.* "I can still clearly remember it," he says. "The waves, the storm—and here you are in this huge floating hotel in the middle of the North Atlantic." Ocean liners became something of an obsession with him. In 1983, as a senior at Colby College in Maine, he applied for a Watson, proposing to examine the significance of ocean liners in maritime history. "It just clicked," says Powers. "I knew this would be perfect." He spent the next year touring European maritime museums and shipyards. Today, he's international sales account manager for the Cunard Line and is completing a book on ocean liners.

Twenty years ago, Jim Affolter was a senior at Williams College, in Williamstown, Massachusetts. "I had this epiphany of retracing Charles Darwin's voyage," he recalls, "and as soon as I had the idea, I had this feeling it was going to happen—like a piece of the puzzle had fallen into place." By ship, by boat, by plane, by thumb, Affolter retraced Darwin's journey, from the Falklands to Tierra del Fuego to the Galápagos Islands—all courtesy of the Watson. After his South American trek, he spent months in the Darwin archives at England's Cambridge University, holding in his hands Darwin's handwritten journals and correspondence. The year emboldened Affolter to pursue his own interests in natural history. He went on to get a PhD in botany and is now director of research at Georgia's State Botanical Gardens, at the University of Georgia at Athens.

Patrick Irwin graduated from Iowa's Grinnell College in 1977, then spent his Watson interviewing expatriate jazz musicians in Europe—men like Dexter Gordon, Mal Waldron, Steve Lacy and the avant-garde composer John Cage. "I went over as a writer and a historian," Irwin recalls, "but being in the presence of those musicians made me realize that's what I was, too. I'd been playing music all my life but didn't think I could do it professionally." Today he plays guitar and keyboard for the B-52s.

Then again, there are those whose fellowships bear little connection to their subsequent careers. In 1975 Andrew B. Zimmerman was an English major at Haverford College, in Haverford, Pennsylvania. He spent his Watson traveling with European circuses and writing a novel. Today he works in New York City as a partner at Coopers and Lybrand, the management-consulting firm. William Fischer was a philosophy major at St. John's College in Santa Fe, New Mexico, but his Watson project was a study of the evolution of the medieval sword. After

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that, he worked with computers at the Los Alamos labs and is now pursuing a PhD in molecular biology.

It is one of the abiding ironies of the fellowship that it embraces eccentricity and yet memorializes a man who is remembered for his orthodoxy. It was Tom Watson sr. who instituted the notorious IBM dress code requiring stiff-collared white shirts—a code that endured for 30 years until his son repealed it after a physician cautioned that the collars might restrict circulation. The junior Watson helped make IBM one of the world's most profitable corporations; he also served as U.S. Ambassador to the Soviet Union during the Carter Administration and as a Smithsonian Regent from 1967 to 1979. His father, who extolled discovery, had helped underwrite Adm. Richard E. Byrd's South Pole expedition.

It is no accident that fellowships sometimes go to students with mediocre grades. "I was a terrible student," Watson, a graduate of Rhode Island's Brown University, told me shortly before he died last December. "I couldn't take that stuff off of the page and get it into my head. I took American history three times at Brown."

Watson seemed unfazed that no former fellows are in Congress or working as senior officials at the White House. "Whether or not they go into government does not mean a hill of beans to me as long as they're useful citizens," he said. Nor did he feel the need to defend quirky projects. "There's a fine line between eccentrics and geniuses. If you're a little ahead of your time, you're an eccentric, and if you're too late, you're a failure, but if you hit it right on the head, you're a genius. So I have never worried much about eccentricity."

The foundation's first director, Robert O. Schulze, had been a dean at Brown. Watson credited him with translating a raw idea to invest in youth into a concrete plan of action.

In some ways, the circle Watson and Schulze began was completed with Tori Haring-Smith, a former Watson Fellow who now teaches English and theater at Brown. When Haring-Smith was growing up in the Midwest, her mother read to her from an obscure book by John Sack entitled *Report From Practically Nowhere.* It was about a journalist's travels to the 13 smallest countries in the world. The stories left an indelible impression. In 1974, as a senior at Swarthmore College near Philadelphia, Haring-Smith proposed to the Watson foundation that she be allowed to visit those same countries. "I wrote down the one thing I had always wanted to do and I did it. How incredibly magnanimous to say, 'You don't have to give anything back'—to say, 'I invest in you.'"

The smallest country in the world when Sack wrote, Haring-Smith recalls, was the Sovereign Military Order of St. John of Jerusalem, Rhodes and Malta—S.M.O.M., for short—a nation so tiny it existed within a three-story building in downtown Rome and had room left over to rent out the first floor. Only three people lived in the country: the president, the secretary and the treasurer. Other nations were not so easy to reach. When Haring-Smith was a mere 30 miles from the Lilliputian former

Tori Haring-Smith, an aficionado of tiny countries, visited palace of Swat (above) in 1974. Now a professor at Brown, she likes exploring another small place, Nantucket.

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nation of Amb in the Himalayas, the Tarbela Dam flooded the country and relegated it for a time to the bottom of a lake. Haring-Smith was barred from visiting another minuscule nation on her list. Athos, an autonomous theocracy in Greece, turned out to be an all-male monastic community that prohibited women.

The difficulties she encountered on her journey to "practically nowhere" taught Haring-Smith a lot about resourcefulness. "I have a feeling you could put me anywhere on this globe and I would find a way to survive," she says. "I don't think I had that at all before I left."

More than 20 years have passed since I set out on my Watson odyssey. That's time enough to come to some conclusions. Much of what I learned about Ireland, Italy and Greece has dimmed, and the year's crises long ago lost their threatening edge. Still, much remains: the craving for exploration, the willingness to take risks, the belief that setbacks may be opportunities in disguise. In a sense, my Watson year became the model for my life. As a journalist, I have continually sought out what might be called mini-Watsons—self-contained projects that enable me to learn about the world and myself. In recent years I have tagged polar bears off the Siberian coast, tracked the illegal trade in ivory from Nairobi to Tokyo, crawled on my belly through West Virginia coal mines and visited remote mountain villages along the Burma-China border. Each episode has been grist for a story. More important, each has allowed me to experience again the exultation of discovery that I first encountered as a Watson Fellow.

Pat Irwin, guitarist and keyboard player with the B-52s, spent his Watson year conducting interviews in Europe for a book on expatriate jazz musicians. That convinced him he could become a professional, too.

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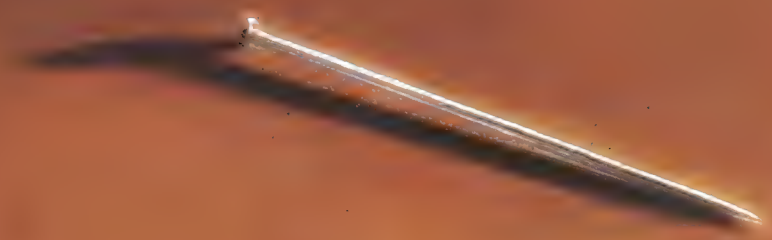

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By Richard Wolkomir

We're going to have computers coming out of the woodwork

At the Xerox Palo Alto Research Center, or PARC, researchers are deconstructing the PC as we know it—and changing the way we will live

"We're talking about a technology so powerful it's invisible!" computer scientist Mark Weiser told me. That flew over my head.

Scientific journals had said that Weiser—one of Silicon Valley's leading wizards—was working on something he called Ubiquitous Computing: he meant to extract computing from computers and disperse it throughout society. But what did that mean? I had come to the Xerox Palo Alto Research Center, or PARC, to find out. And I suspected that when I finally understood it, I might not like it.

Weiser, a bald and black-bearded teddy bear of a fellow who is the director of PARC's computer science laboratory, put his fingers to his forehead, the place where all the thinking was going on. Then, having figured out how to give his not-from-Mensa visitor at least a glimpse of what he was up to, he led me briskly down the hall to see an office he had wired up for his lab's newest researcher, Helen Davis.

"See, these are my coworkers," Davis told me, pointing to a pad-size screen that sat upright on her desk. The screen was divided into multiple squares, or "windows." In each window appeared the image of another scientist, at work in another office somewhere in this sprawling think tank.

From her desk, Davis could watch her coworkers sitting at their desks. Some typed at computers. One woman held an impromptu meeting in her office. A man gazed out his office window toward blue San Francisco Bay in the distance, apparently in a trance induced by deep thought. "They all see *us* right now, too," she said cheerfully.

Davis had worried she would feel uncomfortable, always visible. "But I found that it helps me to feel instantly part of the group," she said. She had not yet met all her video companions, "but even so, when they leave at night I feel isolated!" she added, glancing fondly at her flat-panel display screen.

Teams of on-screen colleagues, who might be spread out from New York to New Delhi, are only a small part of Mark Weiser's technological new world order. He means to kill off the personal computer as we know it. That is ironic, because PARC *invented* the personal computer in the early 1970s. But Weiser wants computers to vanish into the woodwork—literally. He intends to deconstruct the stand-alone computer, shell it like an oyster, and embed its microprocessors in the walls, desks, light sockets, doorknobs and practically every other square foot of your workplace and home. Those chips will communicate with one another and connect via the "information superhighway." Computing will be as available as electricity—wherever you are, a little gadget in your pocket can plug you into the global digital flow.

But what I really wanted to know was, what will Ubiquitous Computing do for us? And, maybe, *to* us?

At PARC they now talk about "social computing." They say: "This is not really about technology—it's anthropology." That is because the odds are that Mark Weiser might rearrange society as thoroughly as Thomas Edison did when he electrified the cities.

For one thing, since PARC opened in 1970 it has been computerdom's Oracle at Delphi, with a suitably magisterial motto: "The easiest way to predict the future is to invent it." And PARC's track record is legendary. After scientists here invented the personal computer itself, they went on to invent laser printers, "windows" (which allow a computer screen to show several operations at once) and the Ethernet system for networking an office's computers—in fact, much of what we regard as today's standard computer technology.

They are the researchers who brought us portable computing and modern chip-making technology. They also introduced an innovation so seminal that we never stop to think about it: icon-based computing. (In other words, the use of on-screen symbols—the kind you can click onto with your "mouse" or, in some instances, press with your fingertip to issue commands.)

Oddly, however, other companies—not Xerox—spun most of PARC's innovations into commercial gold. "There's no question we could have done a much better

Comes the technorevolution, "ubiquitous computing" is likely to have a remarkable effect on daily life.

Illustrations by John Huehnergarth

In a chummy chamber known as the "beanbag room," pensive scientists lounging about in trendy chairs first dreamed up the personal computer.

job than we have done," PARC's director, John Seely Brown, told me. "But, having said that, virtually every piece of technology we've invented at PARC is now incorporated in our products." By the early 1980s, he said, Japanese competitors were pounding Xerox. The company focused on its main product, building into its photocopiers such PARC innovations as icon-based computing. More or less by default—partly because the patent process for software was in its infancy, partly because some PARC researchers left to develop their ideas elsewhere—Xerox largely ceded development of its innovations' personal computing aspects to other companies. (They did develop and market a proto-PC called the STAR, but it fell flat.) Now, said Brown, Xerox has reorganized so that it can better exploit radical inventions coming out of PARC.

But I had arrived in Palo Alto with the technological blues. I suspected "information superhighway" might be code for "*Zap* goes your job!" I write words that get printed on paper. Would I go the way of the writers of silent-film captions? I had just read about a new $100 computer program that is replacing newspaper sportswriters. Who would be next? It made me cranky.

The Xerox PARC building is set into a hillside bounded by horse pastures. It is a low concrete-and-glass structure, with vines spilling over its eaves. Far off, San Francisco Bay sparkles, and the Hoover Tower pokes above the eucalyptus trees on the Stanford University campus.

When I first visited PARC, I stopped at the famous "beanbag room" where, two decades ago, Xerox scientists lolling in funky chairs had thought up the personal computer. I sat in one of the beanbag chairs myself, but no brilliant insights came. So I headed upstairs to talk with Weiser, who thought up Ubiquitous Computing in 1988, perhaps in one of these very chairs. He had asked associates to predict new technologies that businesses might need. "A disaster!" he told me, grinning. "Trying to pick the future by committee is not going to work!"

So Weiser tried something radical for a technologist: "I had a lot of discussions with the anthropology group here," he said. "I listened to their criticism of current computer technology and tried to think up a response—this intriguing idea of actually *listening* to the anthropologists!"

PARC employs anthropologists to study the workplace, making the think tank something of a high-tech oddball. So is Mark Weiser. Besides his day job as a Silicon Valley savant, he moonlights drumming for a rock band called Severe Tire Damage. Probably he is rock's

Richard Wolkomir reports that he is waiting for PARC researchers to bypass a pesky glitch: he still can't persuade his computer to oblige him by printing out an address on an envelope.

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smartest drummer. He is ebullient about Severe Tire Damage. He is ebullient about computers. In fact, he is generally ebullient. And so when PARC anthropologists told him that a major flaw of current computers is that they are divorced from their surroundings, he caught the idea's rhythm. In the office—it was true—you were either at your computer or you were doing other things. You were never doing other things *and* at your computer: the computer does isolate you. "That is not the way technology works in a culture—it has to be integrated," said Weiser. "This could not last."

That was when he first imagined computer chips buzzing in all the walls, desks, file cabinets and light switches. A chip would be in your pen, too. And maybe in the bell at your front door. And you would carry chips around, the way you now stick a pencil in your pocket or wear a wristwatch. And all those chips would "talk" back and forth via radio or infrared signals.

Weiser decided that computers could then become functionally invisible, the way a telephone or a pencil seems invisible to us. You don't have to think about how to work a pencil. You don't need to know how they get the lead into it. You just pick it up and start writing. Why couldn't computers be that way—tools so easy to use that you hardly see them. You just use them.

And what if, eventually, it were not just your office buzzing with computers? What if it were the world?

"At first, I was so excited I couldn't sleep at night," said Weiser. "But that had happened before!"

Computers, computers, everywhere

This time, however, the idea stuck. Ubiquitous Computing is still at the Wright brothers stage. But university researchers already are taking up the idea. And PARC has developed pieces of the technology. "We should look at some more of this stuff," Weiser suggested.

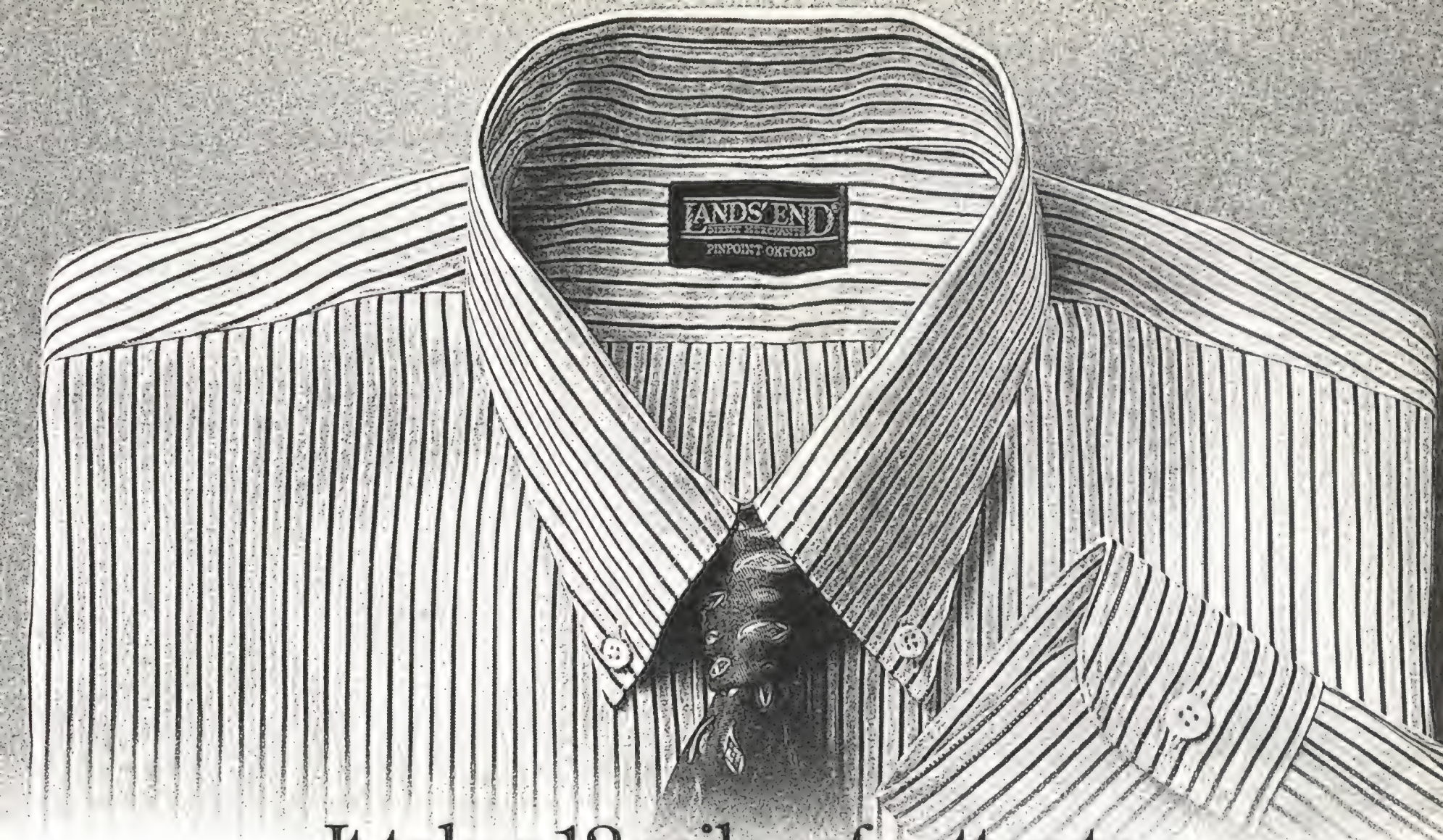
On our way from his office to the adjacent lounge, we encountered a sofa. I walked around it. Weiser stepped over the sofa's backrest, walked over the cushions, then stepped to the floor—meanwhile continuing to talk, as if climbing over furniture wasn't the least bit unusual.

Would Ubiquitous Computing induce a new form of linear thinking? "Too early to tell," I wrote in my notes. Weiser pointed to a screen the size of a huge projection TV, with sofas and chairs facing it in a semicircle.

Corporate meetings used to be held around a blackboard, where chalk-wielding executives wrote up ideas and discussion points. Blackboards gave way to whiteboards and felt-tipped pens. Now Weiser's research team has developed the "LiveBoard." Xerox is selling LiveBoards—the first Ubiquitous Computing equipment to be marketed—as fast as it can make them. "The LiveBoard has a computer inside, and it communicates with other boards, which can be anywhere in the world," Weiser said. He scribbled on the LiveBoard's screen with an electronic stylus. With a flick of his stylus—circling a passage here, jotting a note beside a passage there—he sent some of his jottings into the computer's permanent files. Others he reorganized or moved or enlarged or reworded. The LiveBoard can summon data from the information superhighway, too. And it can function as a centerpiece for teleconferences. If we had been in such a meeting then, what Weiser wrote on his board in Palo Alto would have instantly appeared, just as he wrote it, on other boards, which might have been in London, Sydney and Tokyo.

With currently available audio and video links, people can talk back and forth, face-to-face. Eventually, when video transmission costs drop (right now the video component is very expensive), the airlines will find that to be bearish news. Much business travel will seem

Your "tab" belted on, you would emit signals to receptors (in places like telephone poles) linked up to a network.



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pointless when you can stay in your office and still talk with colleagues or customers in other cities, share documents and drawings, and also *see* their telltale grimaces and grins as you negotiate.

Once, PARC director Brown took some visitors and their small daughter to this lounge to see the LiveBoard. Unable to resist, from the concealment of his office Weiser puckishly wrote messages to the visitors, which materialized on the LiveBoard in the lounge as if by magic. The guests looked dumbfounded, but the child blithely scribbled messages back. Apparently the next generation will take LiveBoard meetings in stride.

Weiser jotted the messages that appeared on the LiveBoard on another piece of equipment his team invented—the ParcPad, a miniature LiveBoard the size of a textbook. In a decade or so, he said, our desks will be littered with them, the way his own desk was now strewn with paper. Other "pads" will hang on walls like Post-it notes, except that their messages, such as cafeteria menus, will be constantly updated. He pointed to a stack of *Computer Architecture News* journals on his shelf. "That stack might be just one pad, and every so often I'd check it to see if the latest issue was out," he said. Pads on your desk might each display a different project or different aspects of the same project. You would use them like scrap paper, except they would have the capabilities of high-powered computers. So you could store what you wrote on them, or send it to other pads or LiveBoards, or have the pads perform calculations, or create graphs, or receive electronic mail, or cruise the information superhighway to fetch information. You could scribble on it with an electronic stylus or, to write at length, you might take a keyboard from your drawer.

Perfecting the pads will require better screens, and they are on the way. PARC engineers showed me a new screen they have developed on which images and print actually appear sharper than if printed in ink on paper. Right now the screen is costly. But Weiser believes that within a decade his "pads" really will be about as hefty as a pad of paper and just as cheap. And they will lie around everywhere. Just start scribbling.

Always "knowing" who you are

But for that to work, whatever pad you pick up must be "authorized" to connect to your personal digital files. And so the underlying Ubiquitous Computing system must always "know" who you are and where you are. Therefore, Weiser's lab has invented one further piece of equipment—the ParcTab, about the size of a deck of cards. If the pad is a miniature LiveBoard, the "tab" is a miniature pad.

"Where's my tab?" Weiser said, perplexed, as he swirled the mounds of papers on his table and groped in his briefcase. "This is the problem with having these tiny computers everyplace—you can never find them!"

Weiser finally did find his tab, which had a miniscreen and a few buttons. Designing it to fit any size hand was a major challenge, he said. Turn on your tab and you are plugged into the information superhighway. Weiser pressed a button: onto the screen popped an up-to-the-second Palo Alto weather report. One version of the tab, which PARC employees wear like a badge, identifies you to the computer system. Wherever you go, it radiates infrared or radio signals that tell the central system: "I am Mark Weiser and, at the moment, I am standing right *here*." It can even be rigged so that any LiveBoard you pass flashes messages just for you.

"Let's see, where's Frederick?" Weiser asked, trying to locate a member of his team. He tapped some buttons and peered at his tab's screen. "It says Frederick is in Room 2111, settled in."

It works, said Weiser, much like a cellular telephone, which turns your voice into a radio signal. The signal goes to a receiving-transmitting station, where radio signals are converted into electrical signals that are in turn fed into the telephone lines. Each station serves a "cell," a section of the city or countryside usually encompassing about one square mile. But such cells are too large for Ubiquitous Computing, which must track you from

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room to room. Weiser is now developing cells down to about room-size (ten feet square or so), so that wherever you are, the tab in your pocket emits extremely weak infrared or radio signals to tiny receptors mounted on walls or telephone poles and connected to the computer system. In that way, the system keeps tabs on you. Perhaps you are in Paris on business. Of course you've got your trusty tab in your pocket. Then you pick up a pad in your hotel room (the hotel of the near future will provide such amenities) and it instantly knows it is you. Via the information superhighway, you retrieve your e-mail or check your computer files back home or at your office. The pad lying in your hotel room has instantly become *your* computer.

What makes Ubiquitous Computing work—the system's ability to track you and whomever you meet—makes it scary. Big Brother, corporate or governmental, really could be watching.

"The person in my lab who's most against this has made his office a dead zone," Weiser told me cheerfully.

He understands the implications. But they don't scare him. "Right now, if you carry a cellular telephone, the cellular telephone company always knows where you are," he pointed out. "One reason I do interviews like this is because people should know what's coming."

Later I talked with PARC computer scientist Marvin Theimer, who is working on the privacy issue. "If we build it wrong, invasion of privacy *can* create problems," he told me. "Society will have to decide what's allowable—even today if Xerox requires my medical records as a condition of my working here, I've lost some privacy."

He held up the tab he carries in his pocket. "People have given us a lot of flak about these kinds of devices," he said. "Well, Ubiquitous Computing is already being relentlessly deployed, whether or not you know it." Today, when computer chips can cost as little as one dollar, he pointed out, even your video rentals are recorded on a computer database at your neighborhood video store. "At the technological level, we can alleviate the problem, but we can't solve it."

One palliative is giving everybody as many different identification numbers as possible. Also, your tab would broadcast your secret numbers but not your name. Then the computer would know where "you" are, but nobody else would. Another safeguard would be to decentralize the system, so that your records are scattered, and nobody could learn all about you by going to one place. "But I can't design perfect security," Theimer said. "Ubiquitous Computing will be deployed, and it will present both benefits and dangers."

What, I asked, might be some benefits? Big things, small things, Theimer said. To shave your electric bills, the system might keep your water heater turned off until it sensed you were waking up. (It could start your coffee, too.) Your morning newspaper, either printed or on a paperlike screen, might focus on stories of special interest to you. The downside of such tailored reportage is that one of the glues holding our disparate society together—everybody getting roughly the same news every day—would break down.

Your car might be driven automatically by a central traffic controller, or the controller might suggest routes for avoiding slowdowns. You could easily work at home, setting a pad to show you video images of your cowork-

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You needn't fret about leaving your oven on: you could tell a computer to turn it off from the air.

ers. Another pad might show your spouse or children as they went through the day. You also could live virtually anywhere. One PARC anthropologist told me she hoped the system would enable her to live in Costa Rica. And the world could, to some extent, customize itself just for you. "I walk up to a Xerox machine in Japan and it automatically shows me the instructions in English, or the street signs around me change to English as I walk by," Theimer said. If your flight to Europe were delayed three hours, he said, your airline's computer could call your house and reset your alarm clock. Not only that: the computer could transmit a notice to your screen at home explaining why you got to sleep late. "And you'd never have to worry about leaving your oven on—you could turn it off from your airliner," he added.

He said computing already is becoming ubiquitous. "Virtually every coffee machine now has a microprocessor inside, and so do cars. But it's all stand-alone, and the next big step will be to interconnect it all."

Corporations, according to Theimer, will reinvent themselves. Workers will no longer be tied to a central building. And at any time you could instantly canvas your coworkers for somebody with expertise on a particular question facing you, no matter where in the world you were, just by jotting a note on your pad and sending it out through the system.

Right now, Theimer said, PARC is experimenting with the notion that a fair amount of corporate business is transacted around the coffeepot. Its researchers are working on a "social virtual reality project" in which workers can wander into a "virtual" coffee room that exists only inside the computer system. Currently, workers keyboarding their way into the digital coffee room receive only an on-screen written description of the imaginary room, giving such details as where the chairs are. "I could meet a colleague from the East Coast in the virtual coffee room, and anybody else who wandered in could join the discussion," said Theimer. Now the researchers are adding audio, so that people in the make-believe coffee room can talk instead of communicating via keyboard. When video transmission becomes cheaper, they will view the imaginary room on their screens and see the other people already gathered there.

When an electronic voice says, "Over to you!"

Ubiquitous Computing is sneaking up on us. The "personal digital assistants" now on the market, tiny computers with fax and cellular telephone attachments, are a step. And any self-respecting new oven or washing machine has microprocessors inside.

Better batteries will be needed. So will better software for handwriting and speech recognition. "We also need a better understanding of issues like fault tolerance," Theimer said. "We'd better not have the computer controlling your car go down when you're heading toward a wall—and an electronic voice suddenly says, 'Over to you!'" Probably the system will be decentralized, with no single computer in charge, so that if one computer shuts down others can step in.

Theimer said the hardest problem will be deploying Ubiquitous Computing in stages, so that each step generates profit. "You have to offer some value at the incremental steps or nobody will buy it. This is a very big issue, involving things like standardization." Within 15 years, the researchers estimate, Ubiquitous Computing will be mundane. Maybe sooner. "What you can do with Ubiquitous Computing sounds like science fiction," Theimer told me. "It will change the world."

That was exactly why I was cranky.

A Carnegie Mellon University researcher has developed a computer you wear like sunglasses. The newsmagazines are agog over "intelligent agents," little digital butlers you send running around the information superhighway on data-collecting chores. Meanwhile, a company called Advanced Neurotechnologies Inc. has announced that it has taken the first steps toward devel-

oping a computer that you can control by thinking! All that and Ubiquitous Computing, too. It's left me with a deeply philosophical question: What about *me*?

I decided to ask PARC director Brown, the tall, bearded mathematician, physicist and computer scientist who is chief scientist at Xerox. He brought anthropologists to PARC and has a knack for seeing technology's social side. "The modern car often has more computing power than the modern office, but is anybody aware of it?" he asked. "Technology is finally getting powerful enough to get the hell out of the way!" That sounded faintly ominous. It was time, I decided, to hit Brown with my big question: "Is Mark Weiser going to deep-six my job?"

As Ubiquitous Computing sends everyone cruising along the information superhighway, I wanted to know, will every Tom, Jane and Junior who has the yen become an electronic writer and publisher, with a potential audience of everybody on the planet? Is the professional writer—I was now getting personal—a deceased duck? "No," Brown answered. Ubiquitous Computing, dark umber in my mind, suddenly was sunlit.

A magazine, Brown pointed out, "creates value" by choosing material for readers. Reading a magazine, you may find yourself fascinated by a subject you would never have thought to investigate on your own. (Who knows, maybe this one.) Also, a magazine or book is still a user-friendly technology: you can hold it in your hands and just lie back in the hammock for a good read.

"What may go away is the reference book," he said. "If I could get the *Oxford English Dictionary* on my tab or pad, I would—I've never curled up in bed at night with the *Oxford English Dictionary*." Yes. Digitize the dictionaries and encyclopedias if you must. But ignore us ink-stained scriveners. Let us keep plying our humble trade.

"Actually, the need for professional writers will continue to go up, to make sense out of the ever-increasing buzz of the world," Brown told me.

I left PARC feeling vitamin-enriched. However, by the time I drove my rental car into the lot at the San Jose airport, my mind had detoured off the information superhighway, and Mark Weiser's vision of computing's future—invisible but everywhere—seemed like the airy notions Lemuel Gulliver heard on Laputa, the flying island.

I parked the car and extracted my luggage from the trunk, ready to trek to the office and wait in line to get my bill adjusted. But an attendant showed up, carrying what looked like a small walkie-talkie.

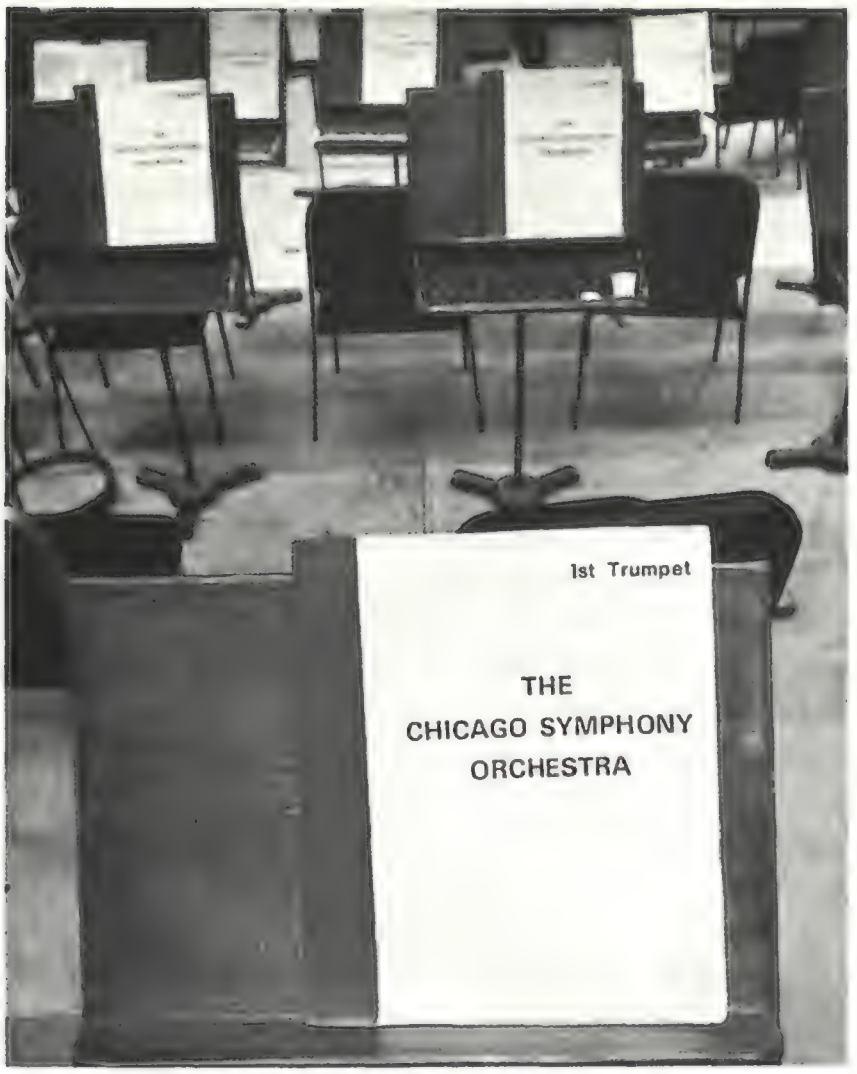
He checked the car's fuel level and mileage, punched buttons, peered at the print that popped onto a screen. Then he punched another button. The instrument spewed out a sheet of paper, which he handed to me. It was my itemized receipt for the car, made out on the spot, in the parking lot, by a hand-held device in radio contact with the rental car company's central computer.

With access to tab technology, you can use your tiny computer device to send digital "butlers" scurrying down the information superhighway at your behest, retrieving data, even turning up the heat before you arrive home.

By Jim Doherty

For all who crave a horn that thrills, this Bud's for you

Adolph (Bud) Herseth is a down-to-earth guy, but there aren't many trumpet players who can generate such a heavenly sound



Bud Herseth and I are in the basement of his two-story stucco house in Oak Park, Illinois, the town where Ernest Hemingway grew up and Frank Lloyd Wright got started in the architecture business. It's a basement pretty much like any other—low ceiling, bare light bulbs, concrete-block walls. Two things stand out.

In the back, where you might expect to find a workbench or a table saw, there is a makeshift music studio. Here the ceiling is covered with acoustical tiles, and several rugs are thrown across the floor. Some 50 horns of various configurations are scattered about, together with a couple of hundred mouthpieces, several plastic bottles of valve oil and reams of sheet music. A chair, occupied by Bud, faces a music stand.

The second thing is the noise. Bud plays the trumpet for a living, and this is where he practices. When I phoned earlier to ask if I could sit in on a session, he invited me to come right over. After ushering me downstairs, he gave a brief lesson in the history of the trumpet, illustrating it with examples from his collection, including a straight, valveless bugle of the type once used for battle signals and ceremonial fanfares. Now, having run through a brisk routine of warm-up exercises, he is rehearsing a number for an upcoming concert.

It is a hellishly difficult piece. His face is as scarlet as a radish from the exertion, but he plays without a hint of strain. Some trumpeters make you nervous. They seem to be silently pleading, "Please, chops, don't fail me now." Not Bud. With him it's simply a matter of "Just do it!" He is sitting with his feet planted firmly on the floor, his back ramrod straight, his ample gut protruding over his belt. He glares with unblinking eyes at the music on the stand. Falter? Fracture a high note? Blow some air? Forget it. Isn't even a possibility.

As for the racket he is making, words like "celestial" and "stupendous" come to mind. At times Bud fuses the robust pealing of his instrument into a core of sound so focused, so dense, I can't help but wonder if he's about to undertake a feat of alchemy, somehow transforming what is, after all, mere pulsations of air into a palpable substance—a torrent of silver, perhaps, that fills every inch of the room, encapsulating us in music like a couple of insects drowned in amber. Talk about power. If the man could generate electricity with that thing, he'd light up half the state.

The soloist pauses, hums several bars, sucks in a breath and forges ahead. When he has finished, he pushes his spectacles up on the bridge of his nose and grins. "Marvelous tune! Lovely tune! Knocks me out every time I hear it. Sensational! Fabulous!"

That's Bud-speak for "I like it." It's a good thing, too, because he's going to be playing it a lot in the weeks ahead. Typically he puts in three basement sessions a day, practicing 40 or 50 minutes at a crack. But

In contrast with elegant formality of the empty stage at Orchestra Hall (above), Herseth dresses informally for a practice session in the basement of his home.

Photographs by Steven E. Gross

Chicago Symphony Orchestra Archives

Fritz Reiner, who led Chicago to new heights in 1950s, looked like an autocrat even while studying a score.

Musicians mill about during break in a recent rehearsal. The Chicago's run-throughs are fast-paced and intense.

this is a down-to-earth guy in more ways than one. He's been married to the same woman for 51 years, has three grown children and five grandchildren. He enjoys fishing, playing golf and rooting for the Chicago Bears. He has a fondness for good food and drink. He once described himself to me, in the course of a long, bibulous dinner at his favorite Spanish restaurant, as "a bit of a smartass."

Bud counts among his friends and the musicians he admires most a disparate group of trumpeters that includes Maynard Ferguson, Doc Severinsen and the late jazz artist Dizzy Gillespie, who was famous for his upthrust horn and bulging cheeks. Gillespie, a black man, once kidded him: "Bud, how come your cheeks don't puff up when you play?" Bud replied: "Diz, how come your face doesn't get red when you play?" Bud himself is not a member of a jazz band. This fall he will begin his 47th season as the principal trumpet player with the Chicago Symphony Orchestra.

The Chicago has long been recognized as one of the world's great orchestras, and Adolph Sylvester Herseth has had a major role in the evolution of its distinctive sound. The trumpet is the most strenuous of all instruments, and the most conspicuous. The trumpet section is a symphony orchestra's offensive line. It provides the muscle for those clamorous big moments in Bruckner, Beethoven and Strauss. It is also called upon to punctuate, embellish and support. A good trumpet section is steady, confident, aggressive. The Chicago's is not good, it is spectacular, and Herseth, its leader, is the main reason.

Although he is not well known to the general public, to the cognoscenti of symphonic music the world over Bud is the premier orchestral trumpeter of his time, and perhaps of all time. Fellow musicians hail him as "a legend," "a phenomenon" and "the prototype." Critics knock themselves out singing his praise. He is a hero to brass students at music schools. Wherever the Chicago goes on tour, young players mob him.

It's unusual for an orchestral musician to receive such adulation, but Bud is special. To do what he does on the concert stage, finishing off grace notes with extraordinary finesse, handling bravura solos and lyrical melodies with equal aplomb, consistently setting a virtuoso standard that inspires his colleagues—to do the big things and the little things superbly night after night, week after week—takes the concentration of a surgeon, the panache of a showman and the nerves of a fighter pilot.

A member of the Board of Editors, Jim Doherty is married to a musician and has four musical children.

Chicago Symphony Orchestra Archives

Georg Solti received gaudy trophy from Mayor Richard Daley in 1971 after a triumphant tour of Europe.

Bud is more than a great instrumentalist. He's a walking history book. He has played under Bruno Walter, who was a close personal friend and associate of the Austrian composer Gustav Mahler; Fritz Reiner, who knew Richard Strauss; Pierre Monteux, who knew Stravinsky; and even Stravinsky himself.

Just as Bud knows conductors—Leopold Stokowski, George Szell, Eugene Ormandy, Erich Leinsdorf and Leonard Bernstein top a short list of other celebrated maestros who have taken guest turns in Chicago—conductors know Bud. "Some musicians of great stature become, in effect, the artistic consciences of their orchestras," Daniel Barenboim, the Chicago's current music director, told me not long ago. "Bud Herseth has been the artistic conscience of this orchestra for many years."

Playing the horn professionally was the furthest thing from Bud's mind when he was growing up in Bertha, Minnesota (pop. 500). His parents, both music-loving Norwegians, expected each of their four children to take up an instrument. Bud was given a trumpet when he was 7. Since his father was the school superintendent, it was assumed that Bud would play at community functions as well as in the school band; he got over the trauma of performing in public at an early age.

He met his future wife, Avis Bottemiller, in fourth grade. She, too, played the trumpet, though not with quite the same devotion. Sitting out on the front porch of her house, Avis could hear Bud practicing at his house. When he stopped, she knew he was probably on his way over to see her.

Bud attended Luther College in Decorah, Iowa, his father's alma mater. (Bud's class ring, dated 1910, is actually his dad's.) He majored in math and planned on going into actuarial work, but World War II intervened and he ended up playing in a Navy band. When he got out of the service, he went to the New England Conservatory of Music in Boston on the G.I. Bill.

A couple of years later, he auditioned for what he assumed was a low-level position with the Chicago. The conductor at that time, the flamboyant Artur Rodzinski, was so impressed that he announced: "Well, you are the new first trumpet." Bud was stunned. He was 26, fresh out of the conservatory and barely knew the repertoire. "I guess I'd better go home and practice," he said.

One of his first numbers with the Chicago was Richard Strauss' "Ein Heldenleben." The guest conductor was Fritz Reiner who, after listening to the new man at rehearsal, asked someone in the brass section, "Where did you find that jewel?" When Howard Barlow, another formidable maestro, heard Bud for the first

Daniel Barenboim, who succeeded Solti on the podium three years ago, listens intently as he wields the baton at a Chicago rehearsal.

time he inquired, "Where did you learn to play like that, New York?" "Nah," Bud replied. "Bertha."

It's a strange world Bud got himself into. Consider, for example, what happens at the beginning of every concert. One moment you see a hundred or so formally attired men and women up onstage sawing, plucking, blowing and otherwise tormenting their instruments like so many crazed penguins. The next moment another penguin comes rushing in from the wings, points a stick and suddenly chaos becomes music.

Think about it—rubbing taut strings with horsehair, vibrating lips on coiled lengths of tubing, whacking animal skins with mallets, and so on, all to produce sounds in accordance with instructions written down by individuals who for the most part have long since departed Earth. It's ridiculous. As a lover of symphonic music, I've often wondered what it takes in the way of preparation to get from the ridiculous to the sublime, and so I made arrangements recently to sit on the wide, shallow stage of Orchestra Hall with Bud and the Chicago's 109 other musicians during a rehearsal.

I am surrounded by violins. Bud and his three trumpet cohorts are sitting in the middle of the back row, behind me and to my left. The noise of the musicians warming up is too hideous. It is hot out here under the lights. The rest of the hall is dark, except for the clusters of tiny illuminations that decorate the box seats.

Barenboim, a stocky figure with a familiar, heavy-lidded look, ascends the podium. He is wearing a long-sleeved white dress shirt, unbuttoned at the throat. The onetime prodigy's face is still youthful, but his short hair is graying now, and thinning. The first order of business today is Five Pieces for Orchestra (Op. 16), a series of intricate poems by the apostle of atonal music, Arnold Schoenberg. Barenboim hurriedly pages through the score, stopping frequently to critique the previous day's rehearsal. He asks the clarinets for more crescendo at a certain place. He asks the oboes for a different sound somewhere else. "May I just say this once more?" Now he is addressing the entire orchestra. He seems almost excessively polite, and the musicians, in turn, give him their full attention. "It is a question of the *thinness* of the sound," he says, raising his baton.

When conducting, Barenboim does not hack and slice the air like his dynamic predecessor, Georg Solti. (It was said that Solti seldom finished a rehearsal without exposing his navel.) His hands move gracefully, unobtrusively; his head tilts to one side with his mouth half open, his eyes half closed. He seems far more intent on listening than leading. When the flutes chirp brightly, he flashes them a warm, appreciative smile.

Suddenly Barenboim interrupts. "Excuse me, clarinets, but I don't think you understand this line . . . violins, maybe here you can give me just a little more sound." The rehearsal moves along in fits and starts. At one point, Barenboim abruptly drops his arms and gapes at a violinist in the front row. "You're playing sixteenths!" he exclaims. "Should be thirty-seconds." A woman sitting near me sighs and mutters, "Oh, come *on*, Daniel."

During a break, Bud and several others relax in a corner of the players' lounge and compare Barenboim and Solti as rehearsal conductors. Nearby, four men are involved in a bridge game. Several women are browsing the notices on a bulletin board. "Solti was efficient,"

Herseth, who started playing when he was 7, usually goes along with the conductor but isn't bashful about expressing his views.

Bud is saying. "He knew what was possible. Danny is not yet reconciled to the fact that not everything is possible. He's very fussy, but he doesn't try to be as Olympian as Solti. He'll kid around and joke with you."

When Bud arrived in Chicago, the orchestra still had both feet planted firmly in the 19th century. Over the first 50 years of its existence, it had been led by only two men, both German by birth, and it was steeped in the Germanic musical tradition. That meant ample servings of Brahms, Beethoven, Haydn and Mozart, and a strong reliance on players with an Old World background.

Many of Bud's new colleagues were aging masters who had immigrated to this country years earlier. Some were so set in their ways that they still affected the black rehearsal jackets customarily worn by musicians in Europe. For them, music was not a job, it was a calling.

Although it was a good orchestra in those days, the Chicago had not yet achieved the stature of the Philadelphia, the Cleveland or the New York Philharmonic. It was said that it was capable of playing great concerts but seldom did. Then the board of trustees hired Fritz Reiner, one of the symphonic world's last grand autocrats.

The Hungarian-born conductor's sinister reputation was more appropriate to a movie monster than a maestro, but Reiner was also renowned for his vast repertoire, extraordinary ear and meticulous preparation. He had built outstanding orchestras in Cincinnati and Pittsburgh by firing people. In Chicago, he discovered that he could work with the considerable talent he had inherited. First, though, came a period of relentless testing.

When an individual had an important part coming up, Reiner would toy with him mercilessly to make sure he was ready. One day he made Bud go over the same demanding passage a dozen times, and then asked him how many more he could manage. Bud looked at his watch. "I've got till 12:30," he said.

Reiner insisted on perfection. Whether the music was an old war-horse or a contemporary work by Stravinsky, Hindemith or his friend Bela Bartok, he was ruthless about balance and intonation. "It is not *clean*!" he harangued the players. "It must be *clean*!"

In due course, with its majestic strings buoyed by the sensational outpourings of a rejuvenated brass section, America's best unknown orchestra finally began to make a name for itself. The glorious Reiner era was succeeded, after an interregnum of several years, by the equally exciting reign of Reiner's fellow countryman Georg Solti. Intense, antsy, decisive, Solti was an irresistible force. He had the ideas and the drive to create a mystique about the Chicago, a mystique that convinced audiences around the world that it was one of the most exciting ensembles ever to take the concert stage.

Like any successful conductor, Solti knew the music and had strong ideas about how it should be presented. What set him apart from many of his peers was his willingness to compromise with musicians who had their own ideas. If, for example, he heard Bud do something he didn't like at rehearsal, he made the correction. "No, no, my dear—not *da-da-de.* I want *biddy-biddy-boo.*" Next time, though, if Bud still played *da-da-de,* typically Solti would relent. "That's fine, my dear. Do it that way."

An unabashed romantic, Solti embraced the hearty Teutonic fare that had dominated the Chicago's menu

from the beginning, but he also served up entrees of Wagner and the post-romantics Mahler and Bruckner. Indeed, Mahler's Fifth Symphony, with its emphasis on tremendous performances from the brass, eventually became identified as the Chicago's signature work; audiences expected to hear it. At a reception one evening after the umpteenth performance, Bud went up to Solti and said, "Maestro, I felt there was something special about the way we played it tonight." Solti glared at him and hissed: "My God, Bud, I can't *stand* it anymore!"

The "band," as Bud calls the Chicago, was sometimes referred to during Solti's tenure as "the perfect orchestra" because each section was so strong. Knockout performers like Dale Clevenger on the French horn, oboist Ray Still and Arnold Jacobs on the tuba could blow people away. They were willing to submerge their big personalities, however, to achieve the wondrously cohesive effect that became known as "the Chicago sound."

Every great orchestra generates a distinctive sound. The Chicago's, as it has evolved from Reiner to Solti to Barenboim, is characteristically full-bodied and powerful, and no one has contributed more to it than Bud. "You can't overestimate the pressure of being the principal trumpet in an orchestra like that," says Charlie Geyer, a teacher at the Eastman School of Music in Rochester, New York, who played alongside Bud for 12 years. "You must always be outstanding." What makes Bud outstanding? "Consistency," Geyer says. "Love of the music. A definite style—*beautiful* phrasing. Technically clear. A tremendous leader. In his playing, Bud literally *demands* that people follow him."

Not, mind you, that the man is perfect. There was the time, for example, when he removed a valve to lubricate it during a performance. The conductor signaled for him to play, but there was no sound. He'd put the valve in backward. He fixed it and started over. Again, no sound. He had "fixed" the wrong valve.

Like most orchestral musicians, Bud is not awed by conductors, but he gets away with tweaking the lion's tail in ways other players would not dare. "Hey, Maestro!" he once razzed Solti at a post-concert reception. "Anytime you think I'm not following you, how about you following me for a while?" Another time, feigning great seriousness, he asked Solti: "Do you know what's the hardest part of your job?" "What's that, Bud?" Solti replied, genuinely puzzled. "*Getting* it," Bud said.

In his cramped quarters at Orchestra Hall, Barenboim recently told me how he turned the tables on Bud one night. During a rehearsal of Brahms' Fourth Symphony, he asked Bud to play a particular note an octave higher than it was indicated in the score. "No way, Maestro," Bud said. "This performance is being recorded, and I'm not going down in history as the man who did *that*." When it came time during the concert, Barenboim looked expectantly at Bud, who shook his head no. Afterward Barenboim called Bud into his dressing room and delivered a long, fancy speech about how much he had enjoyed working with him over the years. "But

When they were in the sixth grade, Avis and Bud (center pair) were already playing with the high school's brass quartet in Bertha, Minnesota.

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Made to his specifications, personalized mouthpiece is one of hundreds lying around Bud's basement.

tonight you disappointed me," he concluded, whipping out a rubber chicken and presenting it with a flourish. "Tonight you chickened out."

Joking aside, Barenboim's story illustrates an essential aspect of Bud's personality. He's tough. Early in his career, a car accident cost him a half-dozen front teeth and split his lower lip so badly 13 stitches were needed to close it. A mere mortal might have feared the end of his playing days. Bud had his mouth rebuilt and six weeks later resumed his seat. His lip was numb and his mouthpiece felt funny, yet somehow he produced the same gorgeous sound. He can't explain it.

That pretty much sums up Bud's whole approach. He refuses to make a big deal about "technique." Playing has less to do with the mouth than the ear, he says. "You have to start with a very precise sense of how something should sound. Then, instinctively, you modify your lip and your breathing and the pressure of the horn to obtain that sound.

"A lot of potentially good horn players have been screwed up by teachers who insist that the only way to play is the way they play. That's a crock. Each person has to do it his or her way. There's no secret about how you learn to make a good sound. You work your butt off."

To succeeding generations of Chicago players and symphonygoers, Bud has become the personification of the same iron discipline those old men in their black jackets once represented for him. "You have to have the discipline," he says. "If you don't come with discipline in your soul, somebody's going to put it there." Translated, that means practice, practice, practice.

Bud's routine has varied little since he and Avis moved into their house on South Clarence Street in 1949. On a concert day, the orchestra typically schedules a 2 ½-hour morning rehearsal; the concert itself may run 2 hours or more. On a non-concert day, there may be two rehearsals, one in the morning, one after lunch. Bud usually catches the 9 o'clock train a few blocks from the house for the ten-mile ride into the city. He warms up for 15 or 20 minutes before leaving and again before rehearsal starts. On "free" days, he puts in his three sessions downstairs.

The work week is seven days long for Bud. He seldom skips practice on weekends and holidays and doesn't go anywhere without taking a horn or mouthpiece. It's not the amount of time he puts in that's so draining; it's the intensity, the physical stress and the pressure. The concert season extends from mid-September to Christmas. After a two-week break, it continues until the end of May. The orchestra plays an eight-week summer season at Ravinia, an outdoor performing-arts center in the suburbs north of Chicago. There usually is an extended foreign tour in the spring or fall, as well.

For all this the musicians are well paid. The union starting salary exceeds $70,000. Most players make more than $100,000; Bud probably earns at least half again as much. But the money, he insists, is not what keeps him going. It is (and you can envision the boy from Bertha when he says this) the simple thrill of being there. "I get to play with all these great colleagues, to play the world's greatest music under the world's greatest conductors and with the world's greatest soloists, and I've been able to do this for, what, 46 years? Somebody's kidding me!"

If Bud can look back on many good times with the Chicago, some were better than others. The verdict is not yet in on Barenboim. Bud is fond of him, but not everyone is enthusiastic. A brilliant pianist, Barenboim enjoyed a long relationship with the Chicago as a soloist and guest conductor before taking over from Solti three years ago. Since then, he has received the kind of tough scrutiny that befalls anyone who succeeds a legend.

Taking the measure of the maestro

Critics inside and outside the orchestra have grumbled that the Chicago is losing its edge, that it is inconsistent, that Barenboim has yet, in that overworked phrase, to put his own imprimatur on the ensemble's work. There are others, however, who believe the engaging maestro has lately begun to do just that. Barenboim's supporters say he is more subtle and sophisticated than Solti, more attuned to nuance and less concerned about showy effects.

More is at stake than purely artistic considerations. The Chicago, like any major symphony orchestra, is a nonprofit operation. Since subscriptions and ticket sales cover only about 40 percent of its $36 million annual budget, the orchestra must raise the rest. Other challenges, not just for the Chicago but for ensembles

Robert M. Lightfoot III / Ravinia Festival

all over the country, center on the nagging question of cultural elitism—the need to broaden the symphony's narrow (and aging) constituency and reinvigorate the traditional repertoire.

Such cosmic considerations are the furthest thing from Bud's mind on this splendid afternoon at Ravinia. Amid a flotilla of picnic tables, he is the center of attention at a noisy gathering of relatives and friends. The tables are heaped with comestibles, the wine and beer are flowing—but not for Bud. This evening the guest of honor will stand before his beloved orchestra and negotiate the difficult terrain of Haydn's Trumpet Concerto, the "tune" he has been practicing in his basement lo these many weeks.

Avis, an energetic and vivacious woman, seems to be everywhere at once. Bud, resplendent in vivid green trousers and a yellow shirt, is more stationary. He responds to the affectionate teasing of his grandchildren with gruff good humor but nevertheless seems preoccupied. "He never acts like he's got anything down pat, no matter how often he's played it," his daughter Chris tells me. "He doesn't get nervous, exactly, but for as long as I can remember he's sort of tuned out the rest of us when he's had a hard concert coming up. He's thinking."

Bud's greatest worry nowadays, Avis says, is that he will stay on too long. "We've known some musicians who didn't realize when it was time to quit, and it was sad." We are watching a solitary figure in green and yellow trudge across the sun-drenched meadow toward the pavilion. Bud left abruptly, without making farewells. "He needs time by himself to get ready," Avis explains.

A couple of hours later, wearing a tuxedo and a smile, Bud walks onstage before a nearly full house in the pavilion and proceeds to play the Haydn concerto. He does not just play it well. He plays it beautifully and, in the melodious slow movement, the lilting andante, he plays it with deep emotion. When he has finished, his fellow musicians applaud, and the audience, cheering, rises. He pushes his spectacles up on the bridge of his nose and grins. Yeah, Bud. Sensational! Fabulous!

Moments before walking onstage at Ravinia to play the Haydn Trumpet Concerto, Herseth takes a last look at music. Champagne (left) is traditionally presented to soloists by management for post-concert celebration.

By Paul Clancy

Hitting the road in his 'historic' horseless carriage

After years of labor, Richard Stevens finally finished a replica of the 1893 Duryea and—pow! gasp! chug!—triumphantly took off

Frank Duryea (at tiller) won first gasoline-powered automobile race in America, driving 1895 model from snowy Chicago to Evanston and back in ten hours.

When he was taking courses at a community college in 1985, Richard Stevens wrote a paper on the prototype of the first motorcar manufactured in America, and about the two brothers, different as night and day, who built it. His fascination with the Duryea automobile persisted, and after ending his career as an auto mechanic, he decided to create, part by part, an exact working replica of that first car, from its elegant carriage to its quirky two-horsepower engine.

For a skilled mechanic who built hot rods as a youngster, the project seemed reasonable. But the fact was that no one alive had seen the car in motion—and Stevens didn't even know where to find it. Eventually he located the original Duryea at the Smithsonian's National Museum of American History and, in 1988, when it went on loan to the Antique Automobile Club of America in Hershey, Pennsylvania, he photographed it and measured it inside and out.

Stevens planned to hire a pattern-maker to create the metal parts for him, as the Duryeas had done, and find a wooden phaeton carriage like the one the Duryeas used. But since there were no blueprints, he soon realized that he would have to design, carve, forge and machine hundreds of working parts—all of them from scratch. He was, in fact, facing challenges almost as daunting as those faced by the Duryea brothers themselves.

Like the Wright brothers, Charles and Frank Duryea were in the business of making bicycles. Charles was the visionary, the promoter; Frank was self-effacing and in awe of his brother, but he had a passion for tinkering and a genius for machines. They were classic inventors of their day—ambitious, underfinanced and a bit reckless.

In 1892 in Springfield, Massachusetts, they began work on their first car, based on an ill-conceived plan by Charles. The engine had no water jacket because Charles thought it would stay cool in the open air; the ignition system was an alcohol flame; gasoline was shot into the cylinder with a perfume atomizer bought at a pharmacy. Nothing worked.

Charles soon grew impatient with repeated failures and took off for Illinois to promote a bicycle scheme. Frank beavered on alone, discarding his brother's unworkable ideas and finding his own solutions. In September 1893 Frank was ready to test the vehicle—"off somewhere, so no one will see us." The car had no brakes and no steering wheel—Frank aimed it with a kind of tiller—and its belt transmission kept slipping, but before dawn it actually ran. After a few more months of tinkering, the car reached the exhilarating speed of eight miles per hour.

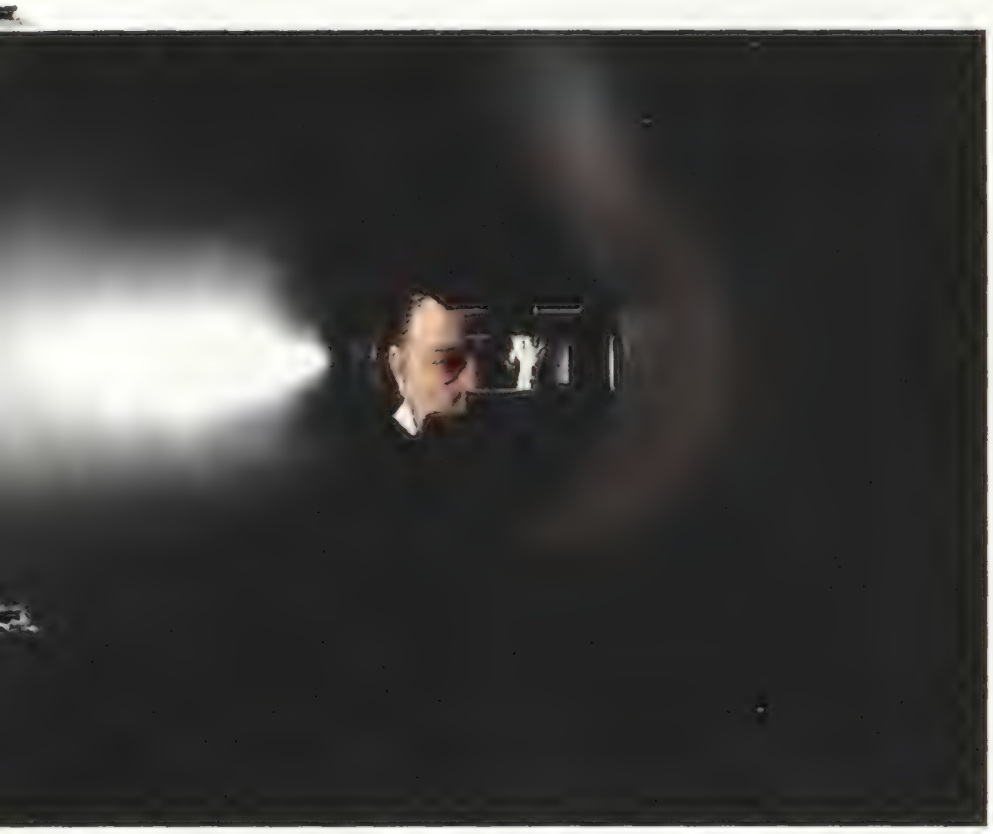
Just a century later, Richard Stevens arrived at an iron foundry 30 miles from Springfield with dozens of patterns he had laboriously sculpted from wood to cast the engine parts. He figures the pattern for the engine block alone took him 400 hours to make. Because it

His hand firmly on the tiller, Stevens and his dream car navigate a country lane at a breathtaking four mph.

Photographs by Seth Resnick

Stevens spent months duplicating all the wooden parts of the Duryea's elegant, curvaceous carriage; he tried plywood, switched to ash, finally used supple poplar.

At local foundry, a fountain of fireworks shoots from molten iron that, once poured into Stevens' molds, will create parts of the car's drive train.



View down the bore of the engine block; it took 400 hours' work, in part because cylinder and combustion chamber had to be machined to the finest tolerances.

Final assembly of the Duryea's wheels and shapely carriage, like à number of other chores, found Stevens (right) and helper lying down on the job.

contains the cylinder and combustion chamber, its interior demanded perfection. After sand molds were created from the patterns, molten iron was poured into them. Within minutes the castings hardened, and the red-hot parts were dumped on the ground. What was recently molten iron had suddenly become an exhaust valve, a tie-rod, a spark igniter. Stevens bent to inspect them. "The last time I saw them they were pieces of wood," he marveled. Later, a truth hit home: "I had to see those parts before I knew it was real."

The dining room of Stevens' two-story frame house was once dominated by an antique, curved-dash, drop-front phaeton carriage: its sole reason for being there was to help him understand the construction and detail of the Duryea carriage. It cost $600. "I woke up in the morning with a little anxiety attack," he confessed. The cost of his obsession, mostly from his own pocket, was something close to $45,000. He has had to dip into his life's savings to create it.

Stevens tried to replicate the Duryea carriage with plywood, then with ash, finally with poplar. The curved rocker on which the seat would rest was the most elegant—and elusive—component. "It's not an arc," he said. "It's not a circle. It's not even an ellipse. The radius keeps changing. It was months before I realized that it's the shape of one side of an egg."

As Frank Duryea was refining the original car in the months after its maiden run, other American inventors were beginning to go quite mad over horseless carriages, and in 1895 the *Chicago Times-Herald* announced the country's first auto race that would include internal combustion vehicles, a 54-mile endurance contest to be run on Thanksgiving Day. There were more than 80 applicants, but only six cars—two electrics and four gasoline-powered models—turned up at the starting line.

Deep snow had fallen the night before. The electrics ran smartly for a while but soon dropped out because heavy snow overworked the batteries. One car's steering gear snapped. Frank Duryea, who had started in the lead, was forced to stop at a blacksmith's shop to repair a broken steering arm, and then at a tinsmith's shop to forge a cylinder part. But other racers had troubles too. By the time Frank got back in the race, only a German-made Benz car was ahead—and it rammed into a horse-drawn hack. The Duryea won the race, and the "Chicago car" became famous overnight.

With Frank at the tiller, the Duryea went on to win races in the United States and England, but there was still little market for such newfangled contraptions: only 19 Duryeas were built. The company folded, but Frank

Paul Clancy, coauthor (with Paul Dickson) of The Congress Dictionary, *now serves as the editor of the Cousteau Society magazine,* Calypso Log.

later formed an alliance with the J. Stevens Arms and Tool Company, which eventually made handsome profits building sumptuous Stevens-Duryea luxury cars. In 1915, after gaining control of the company, Frank sold out to Westinghouse and retired a wealthy man. Meanwhile, brother Charles pursued several dubious ventures, including cars that performed poorly and didn't sell—but until his death in 1936 he maintained that he alone had designed and built the Duryea car. Frank lived to the age of 97, and when he died in 1967, still self-effacing, he left instructions that his tombstone should name him only "co-inventor."

Beside the barn of his friend Jim Koehler on a country road north of Westfield, Richard Stevens grasps the crank handle of a machine that is indistinguishable from the original Duryea. As Stevens cranks, Koehler stands poised with a battery wire that he will clip to the canopy frame at the moment ignition must occur. Ricky Coffin, who machined the engine parts, calls out each time the engine goes through its cycle—intake, compression, power, exhaust—"One! Two! Three! Four!" On "Four!" Koehler clips the wire, Stevens backs off the crank handle, and the Duryea sputters to life with a bang and a shudder. And dies.

Adjustments are made. The engine floods. More adjustments. No fuel to the engine. More adjustments. The car starts but the clutch won't engage, and now the air-fuel mixture isn't right.

Then, at last, Stevens cranks again, and the flywheel is turning, the crankshaft spinning, and the car trembles into life. Stevens presses down on the steering arm, which also controls the gears, and his magnificent obsession, like Frank Duryea's a century before, lurches forward and heads down the driveway.

Stevens turns right, the steel tires rolling easily over the gravel, and heads down the country road. It is a wonderfully curious sight: a canopy-topped carriage that ought to have a horse trotting before it, chugging down the road—with a bearded man on board grinning the widest grin he's dared in seven years.

Ricky Coffin raises a triumphant fist, Jim Koehler claps, as the Duryea's engine trembles into life for the first time, and Stevens, grinning a $45,000 grin, uses the tiller to engage the gears and be on his way at last.

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By Paul Trachtman

NIH looks at the implausible and the inexplicable

One-third of Americans resort to alternative medical therapies. Now researchers are examining whether they work; how comes later

Inside the Office of Alternative Medicine (OAM), a tiny bump on the bureaucratic log of the National Institutes of Health, Nora Richardson, the secretary, is suffering from allergies. As I wait for an appointment with the director, she tells me she has tried bee pollen, but it tastes bitter, so she has sent off for bee pollen pills. "I guess I can be a guinea pig, working in this job," she says.

Having heard that caffeine makes allergies worse, I ask her if she drinks coffee or eats chocolate. "Yes, of course I do," she says with conviction. "If I have to give those up, I might as well die."

The director, Joe Jacobs, is late. A Mohawk Indian, a pediatrician trained at Yale and Dartmouth medical schools, a commissioned officer in the Public Health Service, a former medical director for research and program development for the Aetna Life Insurance Company, with an MBA in health care administration from the University of Pennsylvania, Jacobs has impressive credentials for leading NIH into this new and uncharted terrain of alternative healing practices. But he's very late.

When he arrives at last, he's apologetic. His 7-year-old son woke up sick, he explains, and his wife had an early appointment, so he stayed home. Almost everyone at the OAM seems to be sick or taking care of a sick child on this particular day, one with a high pollen count. A flu epidemic is raging through the nation's capital and its environs. Safe so far is John Spencer, who has joined Jacobs in setting up a research program to figure out which alternative medical therapies really work. A clinical neuropsychologist with a bald pate and skeptical mind, Spencer met Jacobs in Gallup, New Mexico, where they both worked for the Gallup Indian Medical Center. "When I was in Gallup," Spencer says, "I saw the treatment of fairly serious mental disorders, like schizophrenia and paranoia, with indigenous plants such as peyote. That's one kind of alternative medicine. And I can tell you that, generally, it did not work particularly well. It tended to make the individuals more agitated and more upset."

Spencer's mind almost bristles with healthy skepticism. But the rest of him had not been feeling so healthy when he took part in a conference at the Menninger Clinic in Topeka, Kansas, to help researchers there learn the ropes of applying for an OAM grant. He had a bad sinus problem. "A guy offered to treat me," he says, "someone who claims to be a bioenergy healer. Those who believe in this assume that there are electric fields outside the body, and that some people have a gift to manipulate these fields and treat people with health problems. I have difficulty understanding how this works, but I've now been exposed to it myself.

"I sat there with my eyes closed," Spencer recalls, "and this guy was doing these things with his hands above my head, and the first five minutes I didn't experience anything. The second five minutes I saw a red line follow the curvature of my eyelid, and then I experienced heat going right into my nose—he wasn't holding a hair blower or anything like that—but my sinuses dried up and my headache went away. I mean, I have not been on Seldane now for almost 15 months, and I had been on it for five years."

Spencer is still a skeptic, but he's breathing a lot easier nonetheless. And his story is almost a parable of the problem confronting his boss, Jacobs, and the OAM. So much of what is called "alternative medicine" seems so inexplicable, so implausible, that medical research has tended to ignore it. Yet, without this research, there is no way to prove which alternatives really work and which do not.

As Oliver Wendell Holmes, the physician and poet, long ago observed: "There is nothing people will not do, there is nothing they have not done, to recover their health and save their lives. They have submitted to be half drowned in water, half cooked with gases, to be buried up to their chins in earth, to be seared with hot irons like slaves, to be crimped with knives, like codfish, to have needles thrust into their flesh, and bonfires kindled on their skin, to swallow all sorts of abominations, and to pay for all this, as if to be singed and scaled were a costly privilege, as if blisters were a blessing and leeches were a luxury."

Acupuncture, herbal medicine and massage are just a few of the alternative therapies to be examined.

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Not many people are being seared with hot irons these days, but millions of Americans are turning to therapies many consider bizarre. Still more millions are turning to less spectacular forms of alternative medicine.

Only a few months after Joe Jacobs moved into his office, the *New England Journal of Medicine* published a survey of Americans' health-care choices. One of every three Americans was using unconventional therapies for illness, spending $14 billion in the process. Many were simply using herbs or other remedies. A third of those using alternative methods were going to see an alternative practitioner, making an average of 19 visits a year. Of this group, some 80 percent were also seeing an orthodox physician for the same illness, but most of them (72 percent) weren't telling their doctor about the other therapist. All told, Americans had made more visits to alternative therapists in 1990, the year of the study, than they had to all types of primary care physicians by a score of 425 million to 388 million.

The *Journal* article included therapies not being studied by the OAM, principally commercial weight-loss programs. It also surveyed what many today would consider conventional treatments, including exercise and relaxation techniques. Respondents were asked about one activity whose mechanism will never be nailed down by laboratory science: prayer.

Even so, conceded M. Roy Schwarz, senior vice president for science at the American Medical Association, "we were surprised at the frequency with which people went back [to practitioners] in a given year. That raised many questions about whether the methods work—and are they worth the money invested in them in a given year? It reinforced how important it is to do these evaluations."

"We don't have to look at the mechanisms," Joe Jacobs says of alternative practices, "but clearly we have to look at the outcomes of the intervention. If there is a statistically significant improvement, we have to consider it—to look more closely and not write it off."

This is so, he adds, even if a therapy's success might be explained by the "placebo effect"—the kind of cure that sometimes occurs when patients think they were given medicine but were only given an inert pill instead. Studies have shown that the placebo effect can sometimes produce success rates as high as 70 percent. "If you have a 70 percent success rate, what are you doing?" Jacobs asks. "We need to look at that very seriously."

The OAM began as a gleam in the eye of former Iowa Representative Berkley Bedell after unconventional treatments cured him, he said, of both Lyme disease and prostate cancer. Bedell became a believer in alternative therapies and convinced his close friend Tom Harkin, a Senator from Iowa, of the need for more research. Harkin, as a budgetary overseer of NIH, thought the gleam in Bedell's eye was worth at least $2 million.

In authorizing the NIH budget for 1992, the Senate Appropriations Committee wrote: "The Committee is not satisfied that the conventional medical community as symbolized by NIH has fully explored the potential that exists in unconventional medical practices." It provided start-up money for "an office to fully investigate and validate these practices."

NIH did what any bureaucracy would do: ordered a study. A pharmacist, Stephen Groft, was chosen to do the study and named acting director of the OAM. All he had was a telephone and $2 million. "The first thing I had to do," he recalls, "was find out what alternative medicine is! NIH really didn't know much about it."

When he began calling people who might know, he was amazed at the suspicion and fear he met. Some of that fear had been generated by Food and Drug Administration (FDA) raids on health food stores, manufacturers and

A former SMITHSONIAN *science editor, the author wrote a 1993 Last Page on his "recovery" from vegetarianism.*

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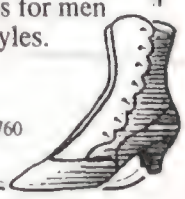

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As Groft talked to people around the country, he realized he would have to create an open environment to allow productive talks between alternative practitioners and government researchers. His safe haven was a conference in Chantilly, Virginia, in September 1992. For two and a half days, the lambs of alternative healing sat down with the lions of medical orthodoxy.

Hard-core scientists, statisticians and health administrators rubbed elbows with M.D.'s who meditate, yoga therapists and others whose practices range from acupuncture to Zen. Working groups were formed to help define the scope of alternative medicine and to suggest ways in which different branches of it could be scientifically studied. Therapies not widely taught in U.S. medical schools or available at most hospitals would at least be looked at.

Many of these therapies involve "lifestyle" programs like "macrobiotics," a vegetarian, natural foods diet; food supplements; and such well-known approaches to managing stress as yoga, and breathing and relaxation techniques. Others focus on "mind-body" approaches, including biofeedback, visualization, art or music therapies, even prayer. Other therapies to be looked at were the traditional practices of other cultures, including acupuncture, from China; Ayur Veda, an ancient healing system from India; homeopathy, a microdose pharmacology from Europe; and Native American healing practices, such as the sweat lodge and certain sacred ceremonies. Finally, there were the therapies once termed "laying on of hands"—as varied as massage and psychic healing—and now discussed as "structural and energetic therapies." There are compromises in all marriages, and everyone was trying to make this one work.

By October 1992, the OAM had acquired its first director, although still no secretary. That took another few months. But Joe Jacobs had always picked up his own telephone, and he had the ideal background and temperament to get things moving. As a Mohawk Indian, he had learned about alternative medicines at his mother's knee. They were what she put down his throat when he got sick. And with his impeccable credentials in medicine, business and government, he could talk to orthodox medical researchers and physicians in their own language. He would soon find that he needed all his skills to survive.

Jacobs quickly organized a series of "site visits" by clinical investigators, including himself, to see firsthand the work of various alternative practitioners around the country. He called this his "*Star Trek* role, to go where no one has gone before." And he set in motion a grant process that would eventually award research funds to university scientists who could provide research assistance to alternative practitioners.

Meanwhile, the OAM brought together experts on methodology to discuss the use of science in areas where, as the physician and epidemiologist Denis Burkitt once said, "not everything that counts can be counted." Some argued for using only the randomized, double-blind methods developed for testing conventional therapies; others insisted that traditional research offered no way to unravel the effects of energy or spirit or lifestyle changes that are so often involved in alternative treatments.

"How would I evaluate a traditional Navajo medicine man?" Jacobs asked a group of NIH scientists. "Would I want that healer to dichotomize his spiritual practices into 200 different parts so I could analyze them individually? This, of course, is the reductionist approach. Or, alternatively, could I look upon that healer as a 'black box' with a well-characterized patient going into, and a well-measured patient coming out of, that therapeutic event and see what happened?" If the black box works, Jacobs asked, do you really have to know how it works?

"To an armchair theorist," he later muses, "obviously it's of great interest,

but who knows? That's my very simple view. The world according to Joe Jacobs."

That worldview was greatly influenced by his early years as a pediatrician in the Public Health Service, on the Navajo reservation in Gallup, New Mexico. There, the medicine men were viewed as allies by many PHS physicians and regarded with respect—although some private physicians saw the medicine men as quacks. As a New Mexico resident who practices the ancient Chinese exercise system called t'ai chi—now being studied by NIH for its healing effects—I can testify that the state is among the more hospitable to alternative medicine.

Once, as he was making rounds at the Indian hospital in Gallup, Jacobs stopped to see a newborn baby with severe cardiac disease and found a medicine man in the room with members of the family. "I went in and introduced myself, and the medicine man deferentially stepped away from the crib," he recalls. "I said, 'No, no, continue.' And he said, 'It's OK?' And I said, 'You can do anything you want, except one thing.' He asked what that was, and I said, 'Please don't light a fire. Because of the oxygen.' And he laughed and promised he wouldn't."

Arriving at NIH, Jacobs found that many of his colleagues had narrow views of medical care. "It's the limited view of the world that specialists have," he says. "If you're a urologist, and the only thing you see all day are bladders and ureters, that's the only part of the anatomy you're focused on. But when you're a generalist in primary care, not only do you see more anatomy, but you see more of the person. Many people at NIH don't relate to alternative medicine because they don't relate to primary care. Their view of the world is skewed because they see only a very small part of the world."

The NIH clinical service offers no primary care, but even so, the predominance of specialists there reflects the current state of American medicine. Less than a third of all our doctors are in primary care practice, such as internal or family medicine or pediatrics. "Many doctors are so concerned with technology, and have put their money on technological fixes," says James Gordon, a professor at Georgetown Medical School and chairman of the National Advisory Council to the OAM, "that they've lost a sense of connection to the whole human being in front of them. They've come increasingly to see people's emotional lives as burdens because concerns about treatment are going to take up too much time. If those issues aren't resolved, doctors may feel frustrated in their effort to maintain a position of detached expertise."

But Gordon sees an awakening interest in alternative medicine among medical school students and faculty. "Medicine, if you practice it on a purely technical level, stops being intellectually challenging once you've treated 40 or 50 patients with a particular illness. The fascination is working with the unique people who experience

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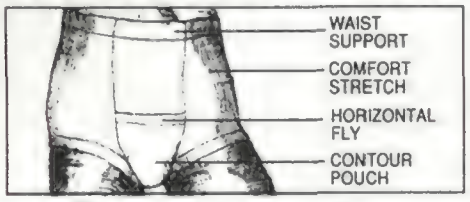

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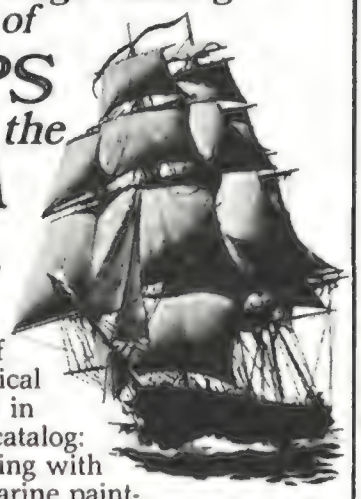

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the illness. Alternative medicine is concerned with the qualities that distinguish people who may have the same diagnosis, and it addresses the mental, emotional and spiritual, as well as biological, aspects of each person's life."

And he sees the same awakening among scientists: "I think scientists interested in breaking new ground are fascinated with some of the findings that alternative systems present. The current scientific model does little to address the effect of the patient's and the practitioner's attitude and belief system. It hasn't given a decent definition of the energy these healing systems describe or explained how participating in a group can affect an individual's illness. And what is meditation, anyway? It's not just a relaxation response—there's something else going on. So all these questions are in the air, and many young scientists are fascinated by them."

The study published in the *New England Journal of Medicine* brought Joe Jacobs new attention both on the NIH campus and off. He was invited to speak to the American College of Physicians, Blue Cross-Blue Shield, the AMA and other conservative medical forums. Telephone calls came not only from alternative practitioners interested in research grants, but from people wanting advice, seeking hope through alternative medicine. One weekend Jacobs and his wife were awakened at 3 A.M. by a call from a woman whose mother was in a coma and who had gotten the impression that he was a traditional American Indian healer. Would he come to Ohio to pray for her mother? she implored.

Even when he wasn't mistaken for a medicine man, Jacobs' public image brought with it new problems as well as new influence. The OAM now had a secretary—and a small staff of experts with clinical and research experience. The staff was setting up conferences, devising a grants program to fund research, and establishing working relationships with other NIH institutes and with agencies like the FDA, which

would have to approve injectable substances or medical devices used in research that the OAM sponsored. As computers blinked, telephones rang (I never saw fewer than 50 messages on Jacobs' desk) and mail piled high in each cubicle of their small suite in a Maryland office building, Jacobs and his staff faced the mounting pressures of public interest and expectations.

Not all the interest was positive. As advisory panels of alternative practitioners prepared reports on their various fields, some of the orthodox medical profession and research establishment accused Jacobs of consorting with quacks and charlatans. A professor at New York's Mount Sinai School of Medicine, Dr. Victor Herbert, wrote to warn Jacobs about two "quackery profiteers" serving on one of the panels. "Note their use of their status as Advisors to your office to lend them credibility," he complained. "Until you remove them you will be guilty of aiding and abetting the defrauding of the American people."

Medical quackery is as old as human history. In this country, the Pure Food and Drug Law was passed in 1906 to take fraudulent medical remedies as well as adulterated food off the market. But it is not always clear where quackery ends and unconventional treatment begins.

At an NIH meeting, one scientist pressed Jacobs to say which therapies he considered quackery. Jacobs pointed to his own work with Navajo medicine men, and how some Southwest physicians call them quacks. "Well, are there any forms of alternative medicine *you* consider quackery?" the exasperated scientist asked. "I have my own opinions," Jacobs conceded, "but as director of this office I really have to maintain a neutral attitude about what is valid and what is not. I'm here to be open-minded."

Ironically, Jacobs came under as much fire from advocates of alternative therapies as from skeptics. Berkley Bedell and other proponents, including those OAM advisers Professor Herbert called "quackery profiteers," wanted some quick field studies to validate alternative treatments. They felt Jacobs was wasting time and resources by invoking the traditional NIH process of awarding peer-reviewed grants to academic investigators. These critics had Senator Harkin's ear, and NIH in turn heard from Harkin.

Jacobs resisted the political heat, arguing that politics should not replace the scientific method. "I'm not going to be able to wave a magic wand over a particular alternative practice and declare it valid or invalid," he says. "I think my job is clear: to support research. And once we get results we will publish them for other people to use."

When NIH finally announced its first grant program for research in alternative medicine, Jacobs' office received

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900 letters—rather than the usual 100 or so—seeking the necessary forms. By the time the deadline arrived, 452 applications had come in.

All applications sent to NIH, no matter what the subject, are screened by its Division of Research Grants. When approached for money, bureaucracies, like the mills of God, grind exceeding fine. The Division of Research Grants is no exception. Its peer-review panels are made up of scientists from various universities, foundations and research organizations, the pillars of professional skepticism. This group of proposals posed a unique problem for the division: few scientists at NIH were familiar with the practices to be investigated; outsiders familiar with the practices might want to fund any research in their own field. It looked like a big headache to Raymond Bahor, the associate chief of referral and review for the division.

Bahor scoured the universities and medical centers for reviewers with knowledge of alternative medicine and enough research experience to know the ropes of the peer review process. Those he asked to serve were sent a packet of model proposals to evaluate, with guidelines and scoring instructions, to give them some practice in the NIH procedures. Then Bahor contacted his pool of experienced NIH panelists. He was afraid he would have few volunteers; in fact, he got too many.

The panels were finally set up, each one mixing a few outsiders with the trusted insiders. During a historic three days in June 1993, the panels met to discuss, argue over and score all 452 proposals. "I held my breath when they first got together," Bahor recalls, "lest someone utter the word 'quack' and set off a brawl." But his fears proved completely unfounded. "At first there was a rather stiff, formal atmosphere," he says. "But by the last day, people were trading information about therapies and research, exchanging phone numbers and acting more like it was the last day of a cruise."

After further review by a national

advisory council, 30 projects were awarded $30,000 each for a year of research. As acupuncture, homeopathy, guided imagery, yoga, massage, macrobiotics, touch and energy healing, t'ai chi, Ayur Veda, and the effects of prayer, among others, became the much-publicized subjects of NIH-sponsored research, the face of American medicine began to change, however slightly and slowly.

To see the character of this change, you need only look at one or two of the practices that were picked for investigation. Homeopathy, for example, uses remedies prepared by a principle of "microdilution," in which a therapeutic plant or mineral substance in solution is diluted over and over again, to the disappearing point. The idea that a substance can work even if it's not really there would seem to challenge the scientific view of nature—not to mention common sense. "I have a lot of trouble with that," Jóe Jacobs admits. Most scientists simply dismiss homeopathy as so implausible that it needs no investigating.

Yet one of the 30 grants sponsored a study of several Los Angeles area homeopaths that was proposed by Michael Goldstein, a University of California medical sociologist. Goldstein calls it a descriptive study that will assess, over a four-month period, the range of clients and problems homeopaths treat, the prior methods used to treat the patients' problems, the patients' satisfaction with homeopathy and any improvement in their conditions. Patients will fill out long questionnaires about their medical condition, job performance, family life, moods, attitudes and all other aspects of well-being, both before and after treatment by the homeopaths. The homeopaths will keep their own records of tests and treatments, which will become part of the study, but the essence of this project is to assess the effects of treatment from the patients' perspective. Positive results would say nothing about how homeopathy works, but would tend to support the claims of the therapists that their treatment does benefit patients.

One of the homeopaths in the study, Linda Johnston, came out of a conventional medical school with a strong background in biochemistry and was herself a skeptic—until she badly bruised her knee one day and doubtfully accepted two tiny homeopathic pills from a friend. "Now, everybody knows a bruise like that takes two weeks to heal," she says, "but that evening I couldn't find it. No pain, no swelling. It was gone. And I thought, wait a minute. If this is true, then a lot of what I've been taught *isn't*." She now practices medicine on classic homeopathic principles.

With Steven Fahrion, at the Menninger Clinic, it was a rib that changed his outlook. Fahrion, a clinical psychol-

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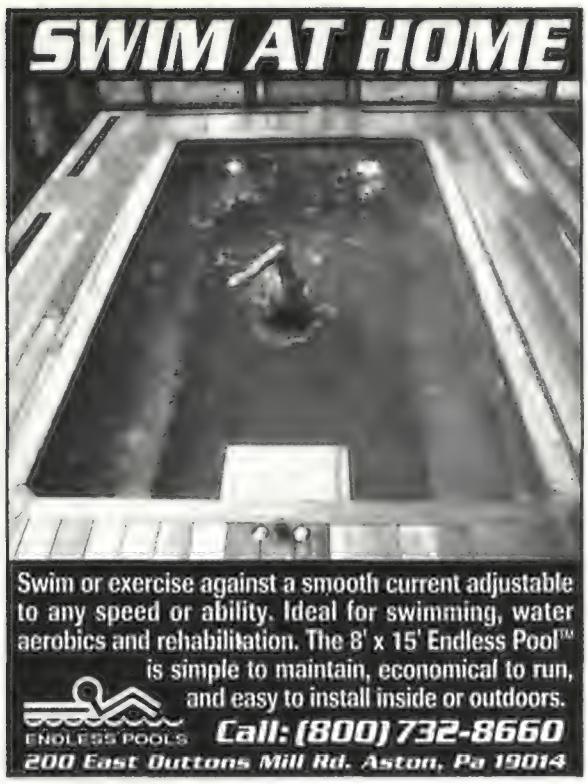
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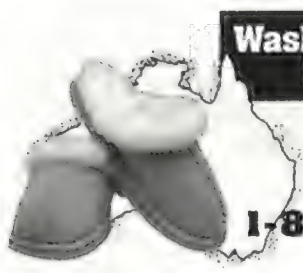

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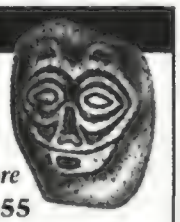

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ogist, had been studying "energetic" healers, who seem able to send some form of energy through their hands to another person, with healing effects. One of these healers, Mietek Wirkus, describes the process as akin to jump-starting a car. "The first time I met him," says Fahrion, "he sort of ran his hands over my body about two inches away, without touching me, and said, 'When did you break your rib?' I had all my clothes on! I had broken my rib when my motorcycle fell over on me, 18 years earlier. I hadn't gotten any treatment for it, and the rib had healed a little bit oddly, in terms of the shape. The next day, suddenly the rib went 'pop' and came back into conformation." He begins to laugh. "So I started paying attention."

Fahrion proposed to NIH a study of the effectiveness of two such energy healers in treating patients with skin cancer. The cancer being studied, basal cell carcinoma, was chosen because it produces a black tumor that can be readily observed and measured. It is also a slow-growing tumor that rarely metastasizes, so there is little risk to the patients in delaying conventional treatment for a few months. Fahrion is working with three dermatologists who supervise the treatment process.

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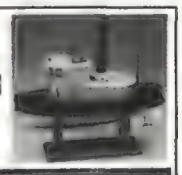

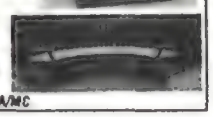

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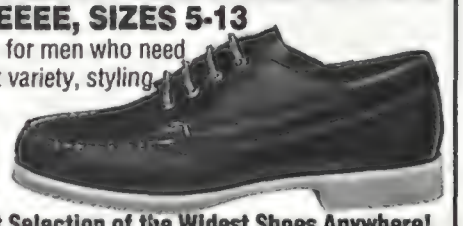

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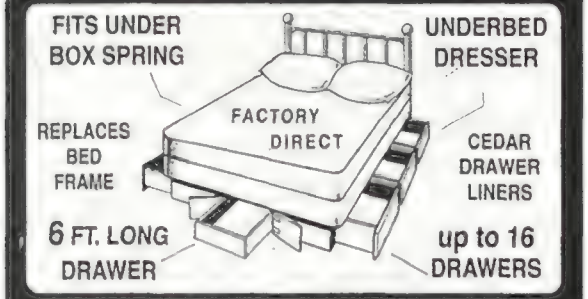

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All of the grants may be more important as symbols of an openness in medical research than for what they actually prove about acupuncture, macrobiotics and the rest. These are small, pilot studies, which at best will reveal the most promising directions for further research. How much of that further research takes place may ultimately have as much to do with politics as with science.

Joe Jacobs quips that his first year's budget, one five-thousandth of the NIH total, was based on a "homeopathic level of funding." It has since risen from $2 million to $3.5 million, but often more is spent on clinical trials for a single new drug at the National Cancer Institute than Jacobs has for evaluating the entire realm of alternative medicine. He doesn't complain. He thinks his real role is to spur the rest of NIH into doing more research on alternative practices, and to encourage physicians to integrate some of these practices into mainstream medicine.

Jacobs points out that many forms of alternative medicine have a long history of testing behind them. "Traditional methods of healing in other cultures do represent several thousand years of trial and error, and they are being used by a majority of the world's population. It's technological arrogance on our part if we fail to recognize this."

The existence of Jacobs' office is a sign that the research and medical establishments are beginning to welcome as colleagues some of the same individuals they once ignored—or denounced as quacks. Some come from other traditions and cultures, and others are the prodigal sons of the establishment's most esteemed medical schools and research centers.

Dean Ornish, an internist, is director of the Preventive Medicine Research Institute in Sausalito and an attending

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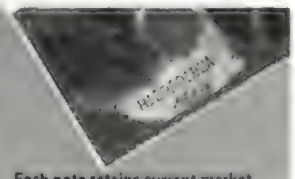

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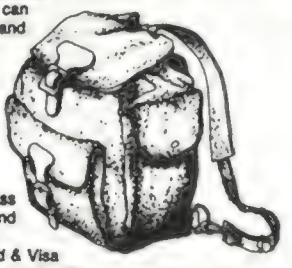

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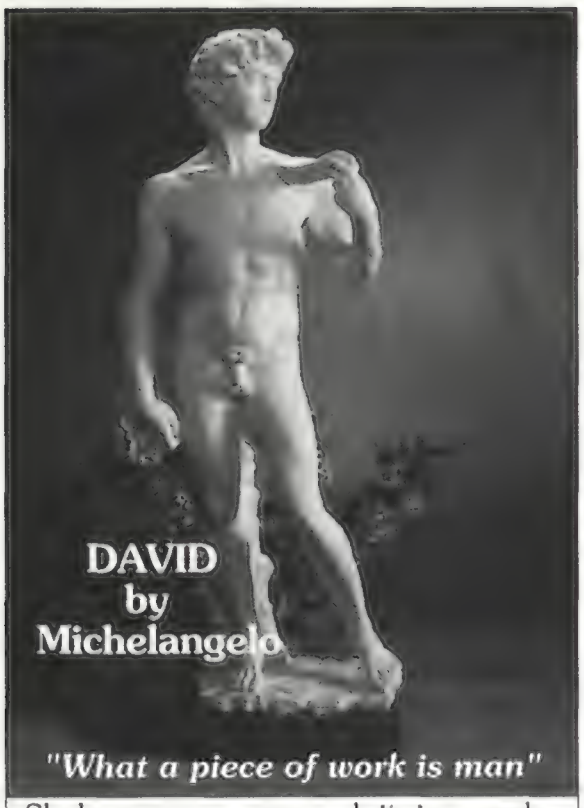
physician at the University of California, San Francisco Medical School. Over the past 17 years he has carried out clinical trials and amassed data showing that coronary artery disease, long held to be irreversible, will in fact regress with a program that includes strict diet, stress management, exercise and group support, rather than coronary bypass surgery, angioplasty or other conventional procedures. His early studies showed that patients could increase blood flow to the heart in just one month. In the beginning, when NIH and the American Heart Association refused to support a year-long clinical trial, Ornish managed to raise funds from oil companies, real estate developers and other businesses, and went ahead on his own. The results were so convincing that NIH came around and extended the study for two more years. After three years, Mutual of Omaha looked at the data and decided to reimburse patients who went on the program.

"It took 17 years," Ornish says, "but medicine is changing. To me, bypass surgery is literally bypassing the problem. It's a metaphor of an incomplete approach to dealing with a life-threatening illness; it's like mopping up the floor around a sink that's overflowing—without also turning off the faucet. Our patients, by addressing the cause of the problem, the lifestyle choices they make each day, are tending to actually get better and better, rather than have the problem keep coming back."

At the OAM, Joe Jacobs reflects on his own acceptance by the medical establishment. Earlier this year he was invited to talk to the AMA's Council on Scientific Affairs. Nothing could have seemed more like walking into the lion's den. After the talk he got a note from the council saying, "The topic of alternative medicine continues to generate both public and professional interest and we are pleased that your efforts at NIH will help clarify these problems. The Council stands ready to assist in any way possible."



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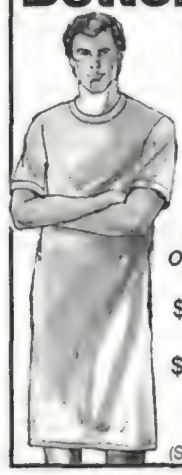
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Now Jacobs says he is ready to move on, having completed his *Star Trek* mission: he believes he has shown it is possible to study alternative practices without sacrificing scientific integrity, and he's sure that some of these once ridiculed practices will find their place in the house of medicine. A new round of OAM grants will be awarded to medical schools around the country to establish "centers of excellence" in researching and teaching alternative therapies. Meanwhile, he is considering several invitations from medical schools to join their faculties, and plans to focus particularly on minority affairs and health for the underserved. "I'm not an expert on Mohawk tradition and spirituality," Jacobs says of his own background, "but there's something we all feel about our pasts and our ancestors, and every once in a while I like to think that I'm sort of a warrior spirit in the bureaucracy. You know, you can't really fight people physically anymore, so what you do is engage in other challenges; there's the thrill of battle in other areas."

Joseph Jacobs, the program's first director, finds himself in the "*Star Trek* role, to go where no one has gone before."

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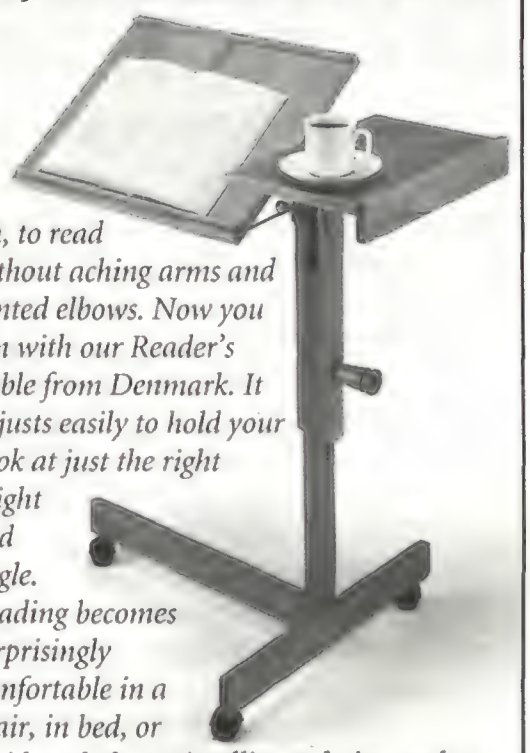

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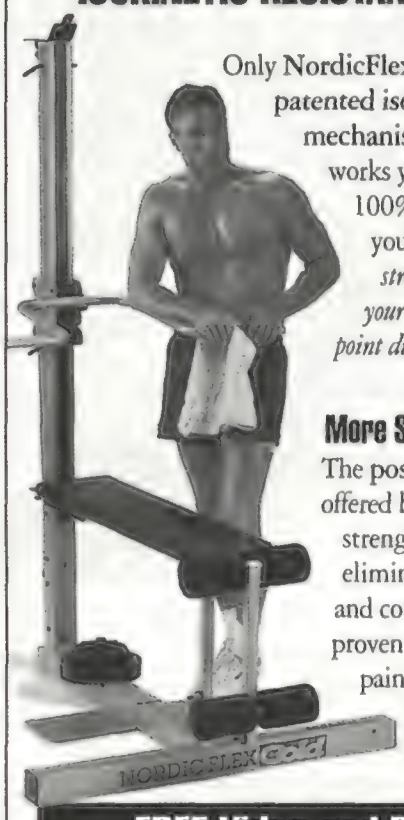

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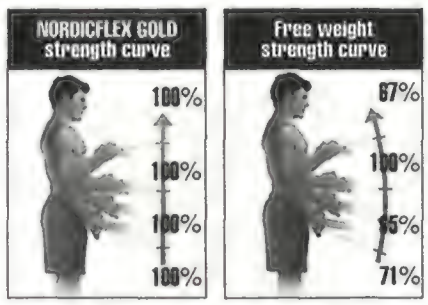

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Book reviews

Hedgemaids and Fairy Candles; The Lives and Lore of North American Wildflowers
Jack Sanders
Ragged Mountain Press/McGraw Hill, $21.95

Whose spirits have not been lifted by a highway rimmed with golden buttercups, a sloping field ablaze with Indian paintbrush, a vacant lot where daisies poke sassy heads through litter and debris? Millions of Americans love and enjoy the wildflowers that abound in our land—but often know little about them. What's the name of that lacy white flower Grandmother used to put in a pitcher on the kitchen table? How did forget-me-nots get their name? And wasn't there some kind of weed that Aunt Kate picked to make wine?

Answers to those questions—and more—can be found in a charming and informative book, *Hedgemaids and Fairy Candles*, by Jack Sanders. This highly readable work, subtitled "The Lives and Lore of North American Wildflowers," goes beyond the standard field guide to educate and entertain. Sanders, a journalist who is executive editor of a string of small-town newspapers in Fairfield County, Connecticut, recounts the folklore surrounding wildflowers, their use as herbs and medicines, their place in literature, their ingenious strategies for survival. He does so with humor and wit, and with scientific accuracy.

What makes a flower "wild"? As Sanders explains, wildflowers are plants that "can survive without our help," often "growing profusely where not wanted." In other words, they are neither more nor less than weeds. Indeed, some of Sanders' favorite subjects—skunk cabbage, dandelion, nettle, fleabane—are often dismissed as weeds. Yet, argues the

author, "nothing in nature does more to beautify our world. Their countless colors and endless designs can be found almost anywhere the sun hits the earth—from fields to woods, deserts to ponds, and even in junkyards, dumps and cracks in concrete."

Sanders chose hedgemaids and fairy candles for his title because of their whimsical names. Hedgemaids, it turns out, are not maidens wielding pruning shears. Rather, they are one of the many names for a ground ivy that came over with settlers from Europe. The ivy, the author tells us, is actually a mint related to catnip that eagerly took root in this country, where it is often considered a nuisance. Lawn freaks find it a pest, while in earlier times farmers despised it because, Sanders explains, "most livestock would not eat it, horses were said to get sick from it, and fields would be overtaken by it."

With characteristic enthusiasm, Sanders makes it clear that he sides with those who call the plant "ground joy." Describing the "beautiful purple-crimson color" of its flower, he claims that "if the blossoms came in giant size, gardeners would surely prize them." He goes on to note that herbalists used ground ivy to treat deafness, citing one early botanist who wrote, "The juice dropped into the ear doth wonderfully help the noise and singing of them, and helpeth the hearing which is decayed."

Fairy candles, a.k.a. black cohosh, are native woodland plants that bloom in midsummer and grow as tall as seven feet on slender stems that end in spires of tiny white flowers—the "fairy candles." The "black" of its alias comes from the dark covering of the roots; "cohosh" from an Algonquin Indian name for a pine tree, which the flowers indeed do resemble in shape.

Sanders expands: "While sylvan fairies may have held sparkling candles that looked like these stamen-laden flowers, American Indians held [the plant] in high esteem, using it to treat rheumatism, pneumonia, croup, and asthma as well as 'female complaints.' . . . Perhaps because the flower heads eventually form pods with loose seeds inside, rattling like a rattlesnake, Indians used the plant to treat snake bite, giving rise to names such as black snakeroot and rattletop." Even 19th-century physicians seized on the plant's medicinal properties, using it to speed a woman's labor and, because it was believed to contain

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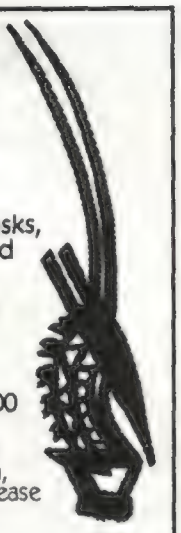

estrogen, to help manage menopause.

A true panacea, it was also used to lower blood pressure–and acted as an effective insect repellant in the bargain. Rubbed on the skin, the foul-smelling flower repels some biting insects, thus earning it another nickname: bugbane. The fetid smell, reminiscent of carrion, actually attracts scavenger insects, however, a strategy that helps the flower spread its pollen but limits its use as a bug spray. "You should," concludes the author, "use black cohosh as an insect repellant only if you don't mind a fly or two stopping by to see if you are dead meat."

Such goes the informative, often witty, chatter about some 80 North American wildflowers in this 230-page book. Unabashedly biased toward what a wag once called "weeds with a press agent," Sanders himself turns out to be the ultimate flack.

He is a self-appointed press agent for the dandelion. "Our tulip in the grass," he calls it, quoting the late American photographer-naturalist Wallace Nutting. To the author, the dandelion is the king of weeds, providing "not only beauty, but food, drink, medicine, and even inspiration for poetry." Besides, he notes, seed-laden blowballs have provided generations of children with fun, while the tender young shoots are one of the most sought-after wild plants for salads and side dishes, "rich in vitamins and minerals, especially in Vitamin A."

There are more than 10,000 varieties of wildflowers growing across North America today, ranging "from odd-looking orchids whose locations are whispered only among trusted friends, to weeds that pop up in every lawn and garden and keep herbicide manufacturers in business." Some were here before humans walked the Earth; others came from Europe, Africa and Asia, "welcome or unwelcome hitchhikers along with human immigrants." Both man and animal help these weeds spread and prosper. Charles Darwin once raised more than 60 wild plants from seeds found in the mud on the leg of one partridge.

To these wildflower-weeds, grouped into three blooming seasons—spring, summer, and late summer and fall—Sanders gives whimsical nicknames reflecting his affection for the plants. Skunk cabbage becomes "The First Flower of Winter"; chickweed is "For the Birds"; dogbane, "A Fly's Worst Friend." He clearly had fun with this book. Take his description of the jack-in-the-pulpit: "The common folk name is perfect. The

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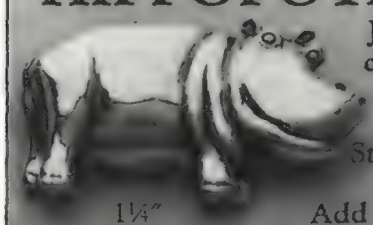

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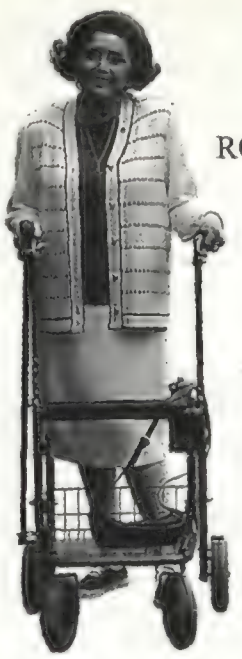
long spathe looks like an old-fashioned pulpit, complete with overhead baffle to amplify and project sermons throughout the church in the days before public address systems." As for its ingenious survival strategy, Sanders reveals that the young plant retains its male identity for a few years before taking on the "tougher job of being a female."

There's a lot to be learned here. How many backyard gardeners, for example, know that pokeweed can grow taller than an NBA star in a few months? Or that "poke" has helped generations of farmers stay healthy in winter, the thick roots, kept in dark cellars, sending up tasty, nutritious shoots that could be harvested weekly and cooked like spinach?

How many nature lovers know that thistles were cursed by God in the Garden of Eden, yet beloved by the Scots? According to legend, as marauding Norsemen crept toward a camp full of sleeping Scottish soldiers, one invader stepped on a thistle and let out a yelp. His cry awoke the Scots, who fell upon their attackers and saved their nation from conquest. Since then, thistles have been proudly emblazoned on countless coins, flags and coats of arms in Scotland, and they grow profusely across North America's meadowlands.

Sanders first became interested in wildflowers in 1972 when he joined an effort to catalog the wildlife of his hometown of Ridgefield, Connecticut. "There were butterfly experts and snake experts, but no wildflower experts," he says. A genealogy and local-history buff on the side, he took on the role of wildflower guru, combing the woods and backyards for common and rare blossoms. He also amassed more than a hundred antique and rare books dealing with the folklore of wildflowers. Within three years he had identified 350 species growing right in his hometown. He wrote a series of newspaper columns about his discoveries, many of which form the basis of this book. Sanders himself received the 1989 Canadian Wildflower Society's Conservation Award and is currently the Northeast editor of *Wildflower* magazine.

Sander's book has been called "nature writing at its very best." Deservedly so, for this handsome volume with its delicate line drawings by Dawn Peterson is—from a human perspective—one of the best things that has ever happened to wildflowers. So let's hoist a glass of thistle wine and give a toast to Sanders and his petaled friends. Long live the dande-



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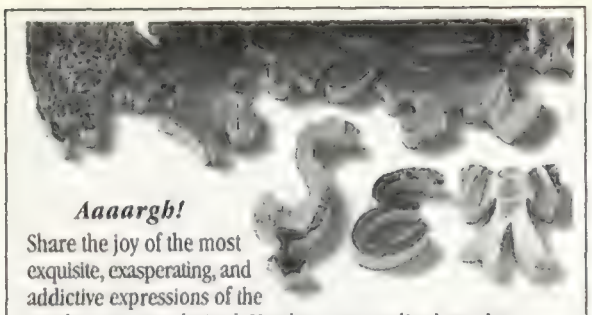

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Animal Happiness
Vicki Hearne
HarperCollins, $20

Since the heyday of the Greek academy, 200 years ago, philosophers have struggled to find characteristics that set men apart from other animals. Man has been, variously, the "rational animal," "the animal that makes promises," the "featherless biped"—a notion refuted decisively by the student who hurled a plucked chicken over the academy wall. It is one of Vicki Hearne's purposes to reduce the barriers between species, to proclaim that when Ludwig Wittgenstein said, "If a lion could talk, we wouldn't be able to understand him," he made a mistake of fact because lion trainers listen to lion talk all the time.

Hearne's new book, *Animal Happiness*, is an eclectic collection of essays about all sorts of animals: lions, orangutans, leopards, cats, horses, frogs—even one sensitive scorpion who absolutely hates it that human beings loathe her. Many of the shorter pieces were published in the *Los Angeles Times Magazine* and are an agreeable way of easing into the more difficult essays at the end of the book, where Hearne confronts some of the grandest animal issues: animal rights, animal language, animal consciousness.

Hearne began her career as an animal trainer and poet. It is an achievement that she has become a fellow of Yale's Institute for Social and Policy Studies and extraordinary that she remains a working animal trainer, one who views that work as a genuine distinction. For trainer Hearne, the test of our theories about animals is a pragmatic one. In her earlier book *Adam's Task*, she mocked academic theoreticians: "one of the reasons I was the audience for so many lectures on the wrongness of the trainer's way of thinking was that the psychologists and philosophers had to bring their animals to me because they couldn't housebreak them [or] induce them to leave off chewing up the children. . . ." Elsewhere she remarks that philosopher Stanley Cavell's "work is hampered by the fact that he has cats but no dogs."

Hearne's thinking is in striking contrast to those animal theorists who reason backward from theories of human consciousness, sideways from religious notions of "soul-less" animals, or those

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animal-rights philosophers who argue, Spinoza-like, from "self-evident" first principles. In the first big animal-rights tract, *Animal Liberation*, Peter Singer asserts that he is concerned only with animal suffering, that otherwise he is not "especially interested" in animals; nor is he "inordinately fond of cats, dogs and horses, in the way so many people are."

It is safe to say that Vicki Hearne is "interested" in animals and may even be "inordinately fond" of them. She is, however, no sentimentalist. I suspect the word "cute" does not exist in her vocabulary. She is not particularly interested in wild animals as "wild animals." She does attend to that place where human and animal concerns intersect. About orangutan trainer Bobby Berosini she says, "An orang trainer, like a monk or a nun, gives up the usual solaces of the world for the sake of his or her animals. A dog and a trainer or a horse and a trainer, do not have to meet each other halfway; they are already in the same social space. An orangutan and a trainer must travel some conceptual space to meet each other and work together. That this is possible, what it means that it is possible, what implications it has for the possibilities of mutual respect—this begins to strike me as a matter of the utmost importance."

Characteristically, Hearne begins her discussion of animal rights with an account of a particular animal, her Airedale terrier Drummer, and what he does at a training session. Hearne does not doubt that rights relationships do occur between a trainer and her dog: "Obedience is reciprocal, and you cannot get responses from a dog to whom you do not respond accurately." She does not believe, however, that abstract organizations like humane societies or the state can grant any particular dog its rights because the dog cannot conceive of the rights in question. Hearne's account is the most sophisticated I've seen. It justifies the skilled animal trainer's discomfort when confronted by an animal-rights movement that seems philosophically contemptuous of animals.

Although *Animal Happiness* is philosophy, it is joyous philosophy, never didactic nor shrill. It stays very close to real dogs (and cats and lions and scorpions), appreciates their jokes, poems and quietude. In animal beauty and mystery, Vicki Hearne finds joy. "All happiness," she reminds us, "is animal happiness."

Donald McCaig published his most recent novel, *Nop's Hope*, this spring.

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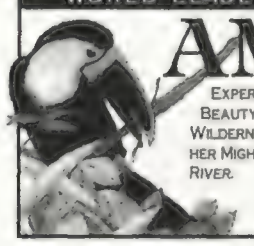
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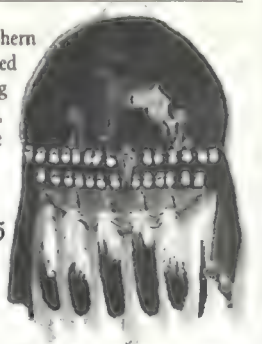
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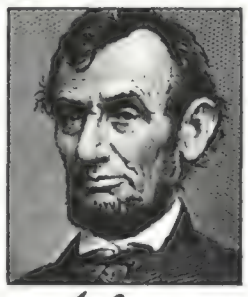
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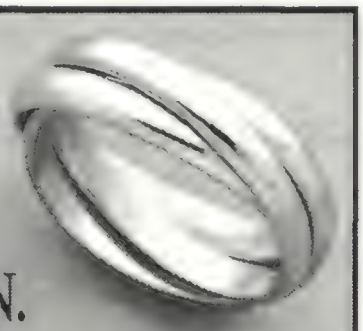
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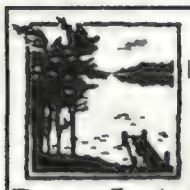
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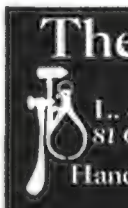
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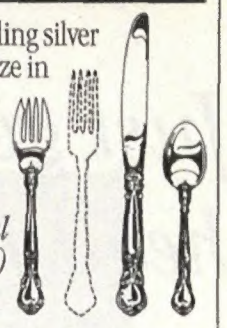

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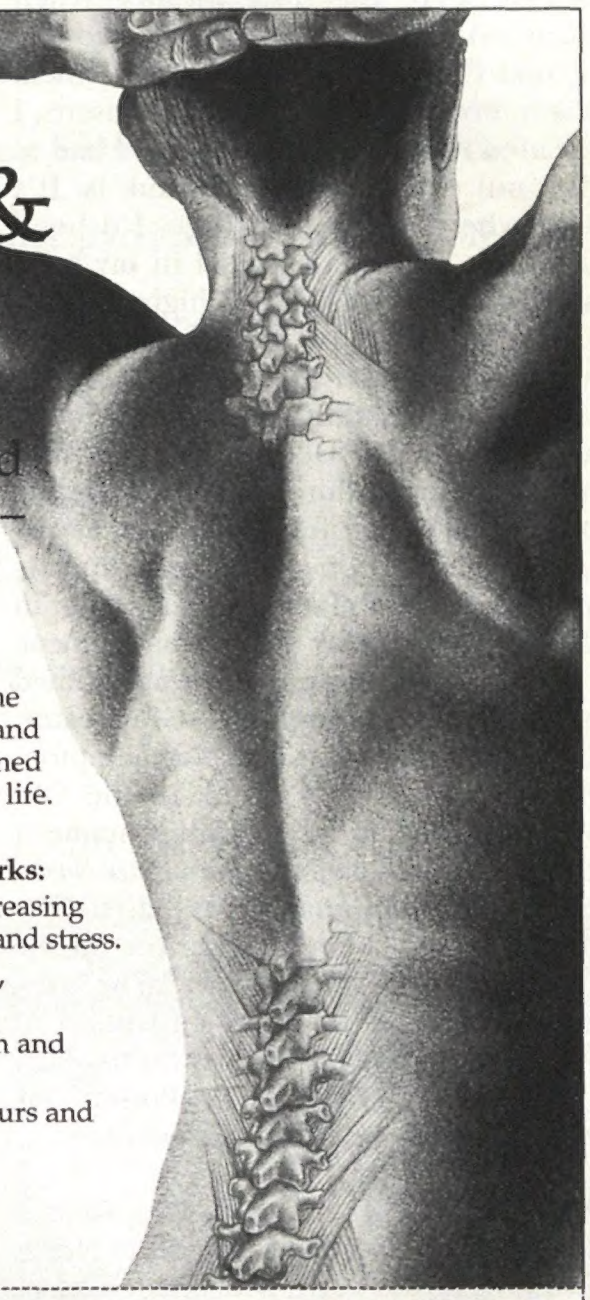

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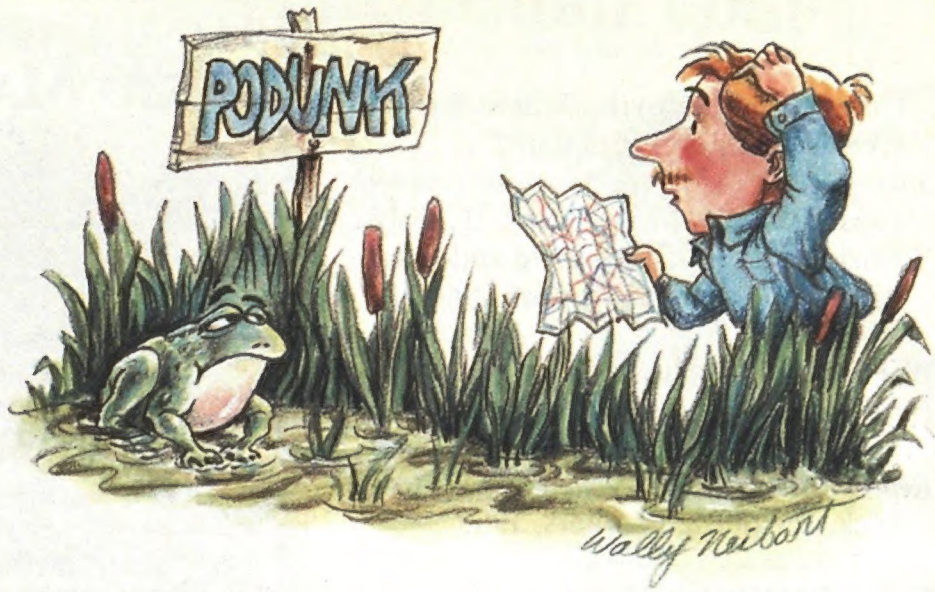
By Norman Kotker

Just go past Shoddy's, head for the swamp, and you'll find Podunk



Podunk, I had always assumed, was a mythical town enshrined in our culture as a symbol of utter insignificance. When I learned that there were in fact a couple of real Podunks, and that one of them was in my home state of Massachusetts, I decided I had to visit it. But first I had to find out exactly where Podunk is. It's somewhere near Sturbridge, I'd been told, but I couldn't find it in my road atlas or on my official state highway map. I checked a lot of old atlases I have around the house: one published by Collier's in 1914; another from 1911 and published by the Geographical Publishing Company; a third, Tunison's, dating back to 1889 and featuring maps so detailed that the one for Massachusetts showed the boundaries of every town in the state. But Podunk wasn't in any of them.

Many Massachusetts towns are named after places in England—Gloucester, Boston and my own town, Northampton. But there was no Podunk in the Old World. It had to be an Indian name. I checked a book called *Indian Place Names of New England* and hit pay dirt: "Podunk" means "a boggy place" or "at the place where the foot sinks in." The book also said it was a village and pond in Worcester County, Massachusetts. Further research revealed that Podunk lay within the town of North Brookfield.

After finding all that out, I enlisted a friend to join me, and it was off to North Brookfield we went. We headed east, across the Connecticut River, the Swift River, Muddy Brook, the Ware River and the Quaboag. The route took us through beautiful, sparsely settled countryside. We reached West Brookfield where there were signs advertising farm stands and an orchard where we could pick our own apples. Holsteins and Guernseys grazed in pastures. Wherever Podunk might be, it sure was set in the middle of a storybook New England.

After a while we spotted a road leading into North Brookfield, and soon we were almost in the center of the town. But no signs indicated where Podunk was. In situations like this, guidebooks sometimes say "inquire locally"; it seemed wise for us to do just that. But there was nobody in sight of whom to inquire. North Brookfield is a very small town. Finally we came upon a tractor-and-lawn-mower repair shop that seemed to be open. Here we inquired.

"Podunk? It's not in North Brookfield," we were told. "It's somewhere around there in East Brookfield. What you do is go down there." The tractor repairman pointed. "And take the first left. Then take your second right and go for a while until you reach Shoddy's Tires. You can ask Shoddy. He'll know."

"Shoddy's Tires!" I exclaimed. "I'd hate to be riding on one of those."

It took me some time to figure out exactly what the repairman had been saying, and I was able to do that only because I'd grown up near Boston. Finally I realized: Shoddy's Tires was really Shorty's Tires. We followed the instructions, and soon we came upon an old wooden building with a few small stacks of used tires in front of it. There was no sign outside, but as soon as the proprietor came out to greet us, we knew we were there. He was very short.

Short or tall, he knew just how to get to Podunk, and he gave us directions in a very loud voice. Some rights and some lefts, past Parsons' Garage and over a railroad bridge. "There's nothing to see there," he warned us. "Only trees."

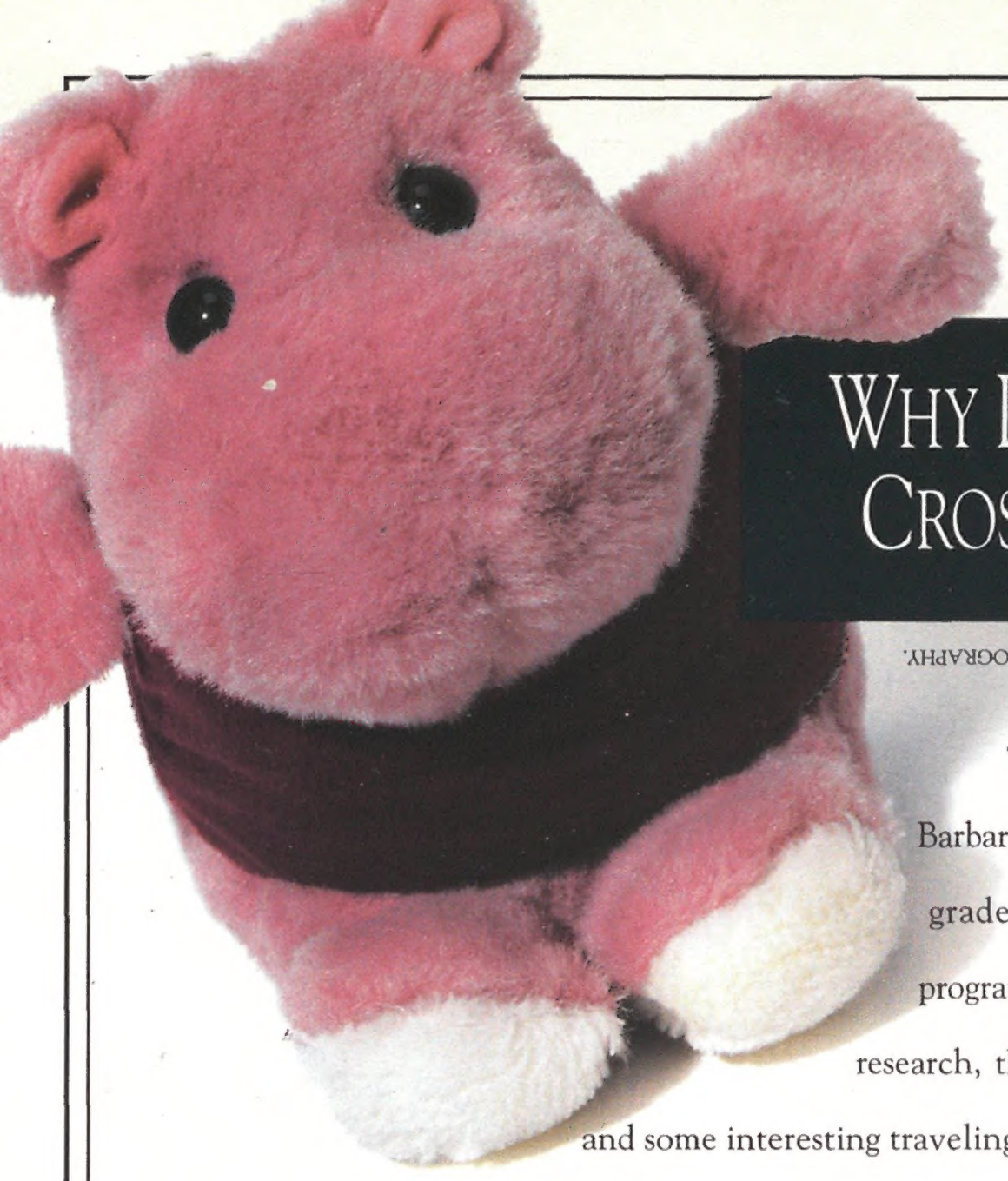
We found Parsons' Garage, drove past it, crossed the railroad bridge and there it was: Podunk Road. This road was older and a little narrower than the one we'd just been on. We drove right along, glad to have found it. But we were still uncertain about something: Would Podunk Road take us to Podunk?

After we'd gone a mile or so, we saw a swamp with clumps of marsh grass—the boggy place for which Podunk itself surely had been named. The Indians who had traveled this route long before the road was built couldn't have passed here without getting their feet muddy. This was it at last—Podunk.

But where was Podunk Pond? After I returned from Podunk itself, I asked Northampton's reference librarian. She found the answer in a 1793 publication, *Worcester County, America's First Frontier,* on page 77 of which it says: "There is one large pond . . . called by the Indians Quaboag Pond; but now more generally denominated Podunk Pond, from a tract of meadow adjoining, which the Indians called Podunk." And as it turns out, all my maps show Quaboag Pond, which is how Podunk Pond is denominated these days, and all show it adjoining East Brookfield.

The swampy stretch we had seen along Podunk Road had been unpopulated, but elsewhere beside the road, along with the trees that Shorty had promised we'd find, were many houses, a few of them much older than Shorty but most considerably younger, built only in the past decade or two. A great many houses displayed the American flag. It became clear that a new generation was rising for whom Podunk is the center of the Universe. There were children's play sets in some yards, and in front of one door a baby carriage was parked.

And then, a bit farther along Podunk Road, appeared evidence of Podunk's older or, rather, post-older inhabitants. There, in a graveyard, lay members of earlier generations. At its entrance was a great boulder with a bronze marker fixed to it, proclaiming it Podunk Cemetery. Every one of the graveyard's inhabitants was out of Podunk now, in spirit at least. Like the dead of even the most famous cities, they had gone to a place where the name of the town you come from doesn't make a bit of difference.



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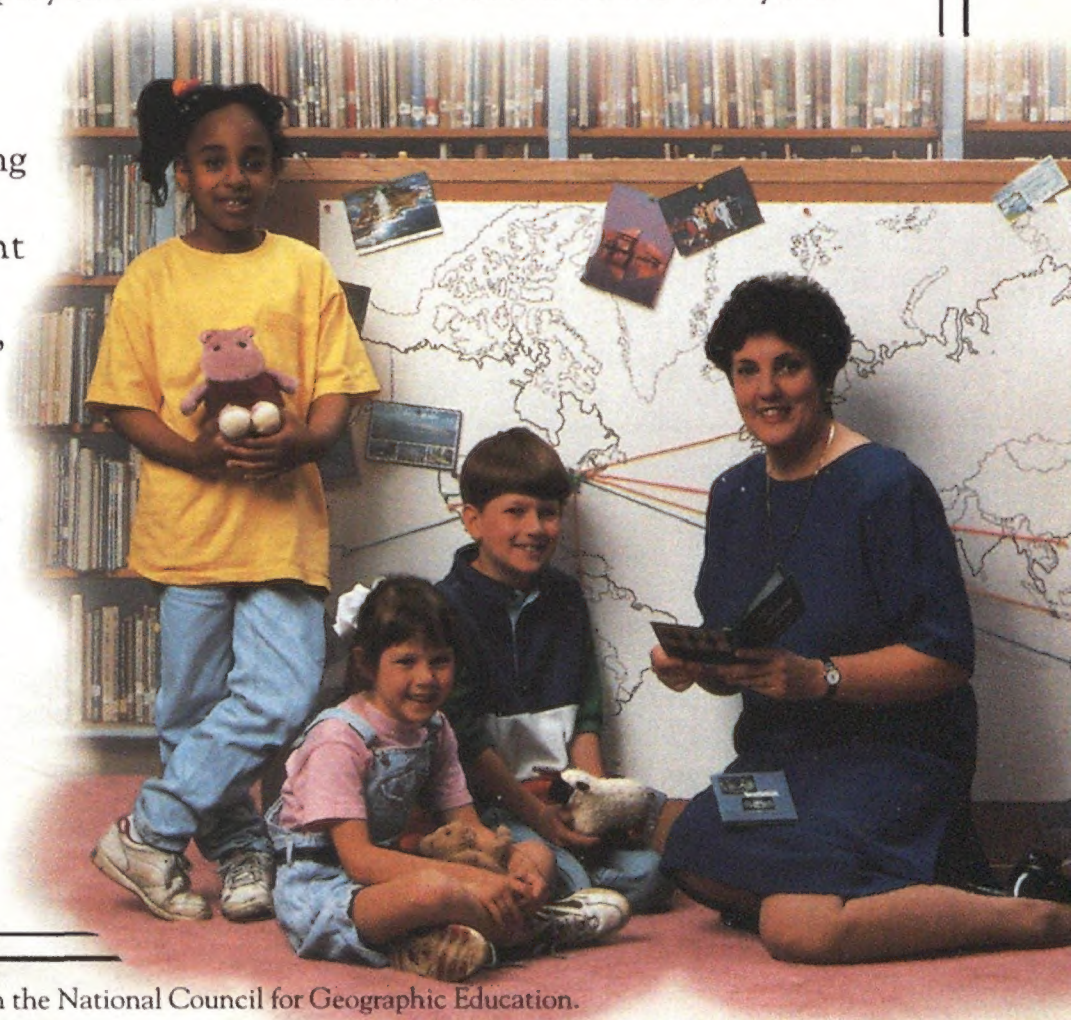

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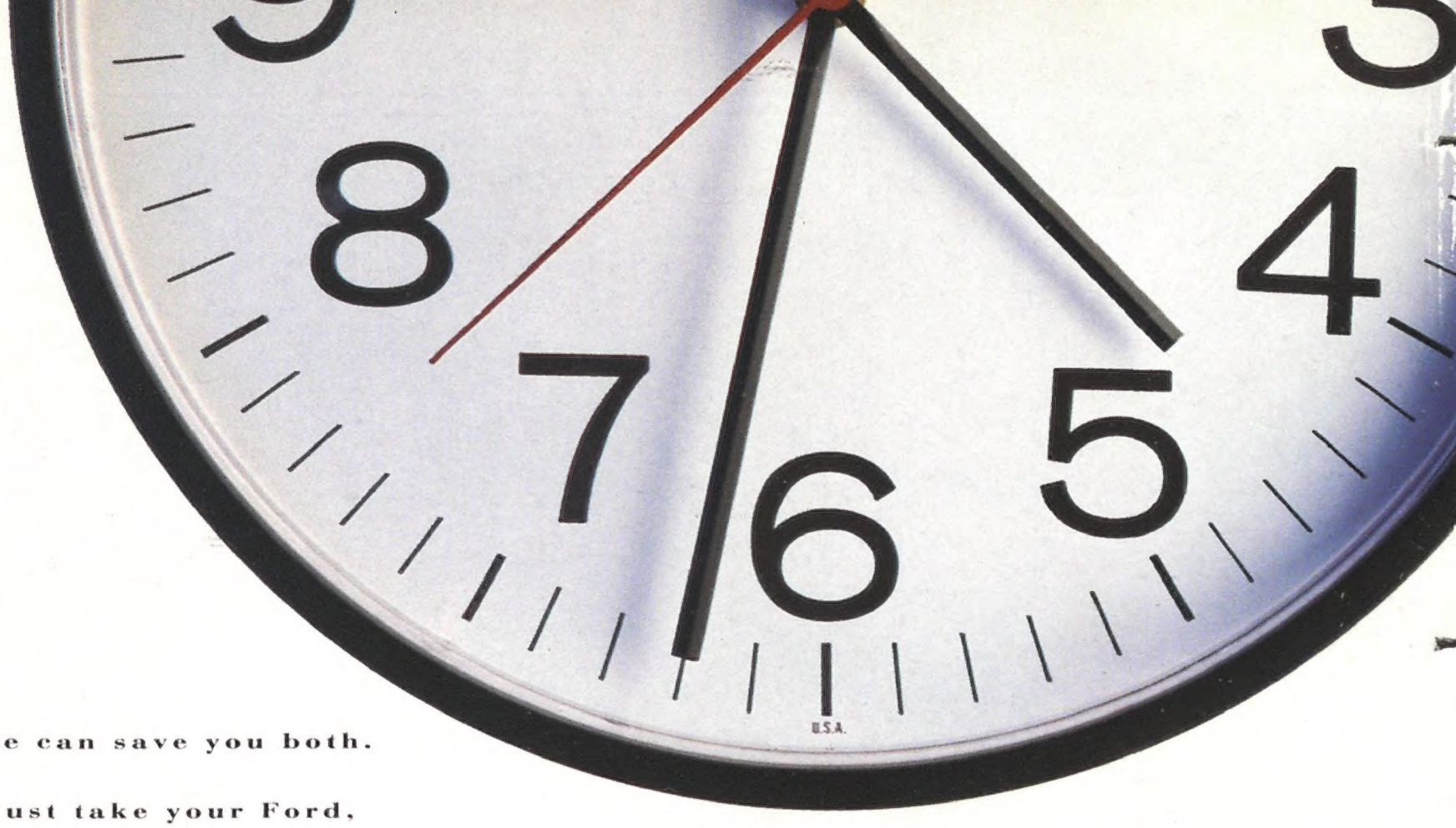

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